

# THE COMMERCIAL CAR JOURNAL

## *G. V. Electric Trucks*

Assure the purchaser, in addition to other advantages:

**Minimum fixed charges  
Minimum insurance costs  
Minimum tire costs  
Minimum labor costs  
Minimum maintenance costs**



Amortization at the rate of 10% per annum is a big item in the purchase and operation of either large or small installations. We don't have to theorize on the durability of G.V. Trucks. We know! Count the old veterans now in service and see what percentage are "G. V."

The G. V. policy of selling trucks only for work in their field contributes to their long life. Hence it doesn't follow, necessarily, that other trucks

even of good design and construction will duplicate G.V. performance. Don't forget that.

Efficiency is sometimes relative, but a truck is either a success in the buyer's eyes or it isn't. If you are a buyer, get the right truck for the right place, and you will have no doubts.

We can give you the right Electric truck.

Catalog 84 on request.

## *General Vehicle Company, Inc.*

General Office and Factory, Long Island City, N. Y.

**New York**

**Chicago**

**Boston**

**Philadelphia**

**"Making One Truck Do the Work of Two"**

## Nobody But a Grocer, Commission Man, or Produce Man is Invited to Read This Advertisement

But if you are one of these three men you are vitally interested in what we have to say about the loading or unloading of heavy-duty trucks, and how to decrease the amount of time your trucks or teams waste because of congested traffic near the wharves, markets or railway stations in your city.

You know that produce has been spoiled while being shipped to you. You know that one team instead of the two or three you now have would be sufficient to haul your goods, if that team did not waste a large part of its time in standing idle waiting while being loaded or unloaded, or waiting for some other fellow's team to get away from the loading platform.

These conditions which you perhaps regard as inevitable, but which you know are making steady leaks in your income, account for the astounding fact that in summer time one-half the produce that reaches New York is spoiled, awaiting transportation across the city. \$1,000,000 has gone to waste in spite of cold storage. You can do your own calculating as to how many trucks you could buy with this money.

Now, many of you have motor trucks and that is a step in the right direction, but unless you have some means of eliminating waste time you are not getting the full benefit of your investment. You can get the full benefit of your investment in trucks with the Locomobile Power-Operated Demountable-Body System.

Duplicate bodies are used on the same chassis. While one body is being filled another body previously loaded is being carried by the chassis to its destination. It takes 3 minutes to change bodies under power from the engine.

The Truck Chassis is kept in constant operation. It works all day long, and for this reason, will pay you

as big a profit on short-haul work as you know it does on long-haul—

And here is a document in evidence in the shape of a report of a truck in the service of Reid, Murdock & Co., one of Chicago's largest wholesale grocers:

**A Five-Ton Truck did the work of 3 two-horse teams.**

**It traveled 41 9-10 miles per day, making two trips, with 46 stops on each trip.**

**It carried 5 1-10 tons on each trip; total, 10 1-5 tons per day.**

**It worked 13 hours per day.**

**It cost \$13.89 per day to run this truck, every conceivable expense included, depreciation, gasoline, oil, tires, driver's wages, garage hire and repairs. Compared to horse service this cost was low, but—**

**Owing to congestion in and about the loading platform this truck wasted three hours each day in being loaded and unloaded.**

With demountable bodies this waste of time, which amounts to 30% of the working time of the truck, is eliminated. 30% of \$13.89 is \$4.16 per day wasted. In a working year of 300 days this demountable-body system would save \$1,248. And we have built the Locomobile Five-Ton Truck, with proper care, to work 300 days per year, and we can prove it.

**This Plain Story is an interesting recital of Facts. It shows how one concern was benefited. If you judge it would benefit you, we merely want the opportunity of discussing your case with you. Our Branch Manager in your city is a specialist on hauling problems. He will tell you frankly just how valuable our truck would be in your service.**

*Send for the following literature:*

1. Our plan for making a five-ton truck pay on short haul.
2. Photographs showing Locomobile Five-Ton Truck in use.
3. Illustrated folders describing our 30 bodies for our truck.
4. Descriptive circular of the Locomobile Five-Ton Truck.
5. Benefits to be had by using the Locomobile Five-Ton Truck.
6. A competitive motor truck test and its results.
7. A Universal Catalog of Five-Ton Trucks (condensed).

### The Locomobile Company of America Bridgeport, Conn.

BRANCHES				BRANCHES			
New York	Chicago	Boston	Philadelphia	Pittsburgh	Baltimore	San Francisco	Los Angeles
	Washington		St. Louis	Minneapolis	Bridgeport	Oakland	

MAKING ONE  
TRUCK DO  
THE WORK  
OF TWO

When Writing, Please Say—"Saw Your Ad. in the C C J"



## THE PUBLISHERS PERSONAL PAGE

*That honesty pays, that trickery and dishonesty do not pay, are written in letters of fire*

### Drop In Circulation Claims

For months we have been endeavoring to show the advertiser the necessity of obtaining facts instead of accepting publishers' claims. Our offer to pay for a thoro audit of the circulation of the publications in the commercial car field is still an offer, because certain journals can't see the advantage (?) of having detailed information made public. Our public offer, however, has had the result of curbing the wild statements of one or two publishers, and that is a step in the right direction. Claims of ten thousand subscribers are now down to three thousand, but with the drop in quantity there seems to have been a rapid raise in quality (?).

We believe that the paid circulation of the CCJ equals the paid circulation of any two truck papers and the quality is better.

Our belief is so strong that we will foot the bill for an audit to be made under the auspices of a trade association or committees of representative advertisers.

Is there any one in the trade willing to start the ball rolling?

### The New Tariff

Truck makers and manufacturers of accessories, parts, and kindred lines, are discussing the effect of the new tariff schedule upon their business.

In order to learn what was the feeling in the automobile industry we wrote a letter asking for opinions.

At the time of this writing, a few of these responses have reached us. These show a general optimistic view of the trade on the subject.

However, twenty-seven representative American makers, thru a committee of five, have entered a protest and have issued a bulletin in which

in other countries, even with their lower scale of wages.

### Ask the Man Who Uses Trucks

It was not long ago that there was grave doubt in the minds of many as to the economy of using commercial cars. To those who are studying the question this doubt has long since been put to rest. All that is necessary is to investigate the work which trucks are daily performing. The records show conclusively economies over horse equipment in almost every conceivable line of business. But recently the statement was made in public by one of the owners of a large chain of retail groceries that his company would never again use railroads for hauling from the storehouse, that the automobile was better and more economical.

### If You Would Know

what users of trucks are doing, how they are saving money over horse haulage; what are the best cars on the market; how to operate them to advantage, read the Commercial Car Journal. "Knowledge is Power"—and this applies to a knowledge of how to operate commercial cars as well as to any other subject. The subscription price is only \$1 per year, for this monthly fund of information, published by the Chilton Company, Market and Forty-ninth Streets, Philadelphia, Pennsylvania.

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the point is well taken, that allowing the old tariff on complete cars to remain at 45% while the tariff on finished parts is reduced to 20% is a joke, and virtually amounts to a reduction to 20% as foreign makers can easily assemble cars here at moderate cost. Nevertheless, as America is now far in advance in the manufacture and use of commercial cars, the feeling is very general that the American manufacturers of accessories, parts, and trucks, are well able to compete with any producer

**Adams Express Company Have**  
**Unusual business acumen**  
**They have so far ordered**  
**Of us the total of 160**  
**Commercial cars for**  
**Added delivery radius**  
**Reason better service**  
**Success assured**



THE ADAMS EXPRESS NOW OWN 160 AUTOCARS

**MAY 7th, 1913, THEY ORDERED 36 CARS,  
 THEIR 12th REPEAT ORDER**

**T**HE decision of Adams Express Company to purchase 36 more Autocar Motor Vehicles is an expression of **CONFIDENCE**.

**CONFIDENCE** in a general improvement of business conditions, which will make a steadily increasing demand on their delivery equipment.

**CONFIDENCE** in the Autocar as the delivery vehicle best qualified to help them meet this situation.

Nine hundred and fifty-four different concerns have adopted the Autocar motor delivery car, replacing a total of 12,818 horses. Adams Express Company has discarded horses altogether in the Philadelphia district.

**The Autocar Company—Ardmore, Pa.**

ESTABLISHED 1897

**SALES AND SERVICE STATIONS:**

Atlanta Baltimore Buffalo Chicago Framingham Harrisburg Lebanon Leo Angeles Reading Rochester San Francisco  
 Philadelphia New York Newark Boston Providence  
 San Juan Scranton St. Louis Toronto Washington Wilmington York

When Writing, Please Say—"Saw Your Ad. in the C C J"

# The Commercial Car Journal

VOLUME V

PHILADELPHIA, MAY 15, 1913

NUMBER 3

## AUTOMOBILE MANUFACTURERS ATTACK THE NEW TARIFF BILL JUST PASSED BY THE HOUSE OF REPRESENT- ATIVES IN CONGRESS

A committee consisting of J. N. Willys, Willys-Overland Company; W. C. Leland, Cadillac Motor Car Company; Charles Clifton, Pierce-Arrow Motor Car Company; Hugh Chalmers, Chalmers Motor Company, and Henry B. Joy, Packard Motor Car Company, have forwarded a vigorous protest to the United States Senate against the proposed reduction in the tariff on automobile parts and also on the complete chassis. It is claimed that the subterfuge of leaving the duty of 45 per cent. on complete cars and reducing the duty on chassis to 30 per cent., and on finished parts except tires to 20 per cent. is a very transparent attempt to hoodwink the American public, as these reductions on the chassis and finished parts are practically the same as though the duty on complete cars were reduced.

Practically no cars are now imported with bodies on them, and it is very easy for foreign makers to ship over the cars in several sections as finished parts and have them assembled on this side at a slight cost.

The protest denounced the bill as a menace to American institutions of industry, and stated that the Democratic majority in Congress is arranging to take care of the foreign manufacturer and the foreign workman by opening the American market to them. The protest is joined in by a large number of prominent motor car manufacturers.

## PROVIDENCE TRUCK OWNERS FORM ORGANIZATION TO FIGHT INCREASED TAXATION

About fifty commercial car owners of Providence and Pawtucket, R. I., at a meeting held on April 21st, formed an association for protection against the proposed increase in the annual tax on commercial motor cars, in which it is proposed to raise the minimum tax from \$2 to \$20, with \$10 for each additional ton of carrying capacity, at which rate a 5-ton truck will be taxed \$60 a year. John D. Turner, of the Scaconnet Coal Company, was elected chairman of the meeting, and Chas. M. Kelly, of the J. C. Goff Company, was elected secretary and treasurer. A committee was appointed to enter form of protest against the passage of the bill before the legislature.

## BOSTON WILL HAVE TRUCK SHOW

A meeting of the Boston Commercial Motor Vehicle Association was held in Boston, May 1st, and the matter of holding a Truck Show for 1914 was fully discussed. The opinion of those present and the expression of several who were unable to be present was practically unanimous in favoring another Truck Show for 1914. The show is scheduled for March 17th to the 21st, and will immediately follow the pleasure car show.

## AUTOMOBILE CHAMBER OF COMMERCE FINALLY COMPLETES ORGANIZATION

### N. A. A. M. and Automobile Board of Trade Dissolve

The completion of the organization of the Automobile Chamber of Commerce, the new body which is a consolidation of the National Association of Automobile Manufacturers and the Automobile Board of Trade, has been held in abeyance because of a vigorous protest which had been made by the Bartholomew Company, of Peoria, Ill. The objections raised by J. B. Bartholomew have apparently been overcome, as the dissolution of the National Association of Automobile Manufacturers has been formally consummated, and the same is the case with the Automobile Board of Trade, in which matter there was no hitch.

The new Automobile Chamber of Commerce at its first regular meeting on Wednesday, May 7th, fully completed its organization and created three new vice-presidencies, to which positions the following were elected: Hugh Chalmers, Chalmers Motor Company, representing the gasoline passenger car members; H. H. Rice, of the Waverley Company, representing the electric vehicle manufacturers; W. T. White, of the White Company, representing the commercial vehicle members. The other officers of the A. C. of C. are: President, Charles Clifton, Pierce-Arrow Motor Car Company; vice-president, W. C. Leland, Cadillac Motor Car Company; secretary, R. D. Chapin, Hudson Motor Car Company, and treasurer, George Pope, Pope Motor Car Company.

It is understood that the objection raised by J. B. Bartholomew was in connection with the Automobile Board of Trade's arrangement with the owners of the Dyer patents, and it is understood that arrangements are being made that all manufacturers who join the Automobile Chamber of Commerce will be licensed under these patents.

## ADAMS EXPRESS COMPANY ORDERS MORE AUTOCARS

At this time, owing to the readjustment of the tariff schedules, business has been more or less conservatively conducted by many concerns who felt that they might be directly or indirectly affected by the tariff. Some of these concerns naturally take a more or less pessimistic view of the situation. That the Adams Express Company, one of the largest users of commercial cars in the United States has no such feeling, was recently shown by placing its twelfth repeat order for Autocar trucks. This last order was for thirty-six cars to be used by the Long Island Branch, and in doing so, the Adams Express Company has indicated its belief in a continued era of commercial prosperity, and also its satisfaction with the efficiency of commercial cars, and the Autocar in particular. This order makes a total of one hundred and sixty Autocars now in the service of this company.



### MASSACHUSETTS GARAGE OWNERS FORM ASSOCIATION

At a meeting, called to order by Chester I. Campbell, of representative Boston and Massachusetts Garage owners, held May 1st, at the Hotel Lenox, Boston, action was taken toward the formation of the Massachusetts Garage Association. The following officers were elected: President, J. S. Hathaway, of The White Company, Boston; vice-president, J. E. Savell, of the Motor Car Service Company, Boston, and secretary and treasurer, Chester I. Campbell, 5 Park Square, Boston.

### PEERLESS COMPANY PAYS FOR DELAYING DELIVERY DATES

A pressure of business upon the Peerless Motor Car Company such as has not existed in the high-grade motor car field since the early days of the industry is revealed in a bulletin issued by E. J. Kulas, General Manager of Sales to the dealers and branches of the company. The company offers all customers whose orders are on the books for delivery before July 1st, \$100 for delaying the delivery until after that date if the delay amounts to 30 days and \$200 if it amounts to 60 days.

### "HORSE, TRUCK AND TRACTOR"

Under the above title has recently been published a most interesting book of 200 pages, by Herbert N. Casson, Rollin W. Hutchinson, Jr., and L. W. Ellis. This book is the first of its kind and heralds the coming of cheaper power for city and farm. It is replete with facts and figures concerning the horse, his cost, and lack of efficiency as compared to mechanical power producing devices.

It takes up the individual uses of the tractor, various sizes for different kinds of work, their cost of maintenance. Some astonishing figures are given as to the cost of feeding horses, and what could be done with this money and the land required for raising the grain. There are cost of operation figures; trucks with trailers; trucks in various kinds of service, and the point is made that the cause of civilization now demands a horseless age.

### JAMES BUTLER, A LEADING GROCER OF NEW YORK, DECLARES COMMERCIAL CARS BETTER THAN RAILWAYS

James Butler, proprietor of the well-known chain of retail grocery stores of New York, recently made the astonishing statement, "I will never again use the railways because the motor truck has them outwitted at every turn in the service of transportation and delivery." He was a pioneer in the use of trucks, and now has in service, in transporting goods from his New York warehouses to the retail stores in New York, New Jersey, Long Island and points over fifty miles from the base of supplies, one 2-ton, eleven 1-ton and five 5-ton trucks. These machines frequently handle shipments of butter, eggs and vegetables to the suburban branches. He makes the strong statement, "We find that the material can be delivered in much less time and better condition and at less cost than by any other known method."

### BOSTON CONVENTION, MAY 20-21

The New England section of the Electric Vehicle Association of America, and the Electric Motor Car Club of Boston, will hold a Convention on May 20-21st, at the headquarters of the new Engineers' Club, at which the new Central Station men, electric vehicle manufacturers, salesmen and allied interests will come together. New England is starting a tremendous boom in electric vehicles. The Central Station men will tell how they have changed opportunity to realization. There will be papers and talks as follows:

"Care and Popularity of Electrics," H. H. Rice, Waverley Company; "New England as an Electric Vehicle Field," Fred M. Kimball, General Electric Company; "How a Central Station can Develop its Electric Vehicle Load," W. C. Anderson, Anderson Electric Car Company; "Constructive Criticism," E. R. Davenport, Narragansett Electric Light Company; "Proper Selling of Electric Cars," Louis Burr, Woods Electric Car Company; "What Service Should the Central Station Furnish the Owners of Electric Cars," L. R. Wallace, The Edison Electric Illuminating Company of Boston; "Advertising the Electric Vehicle from the Manufacturers' Standpoint," F. Nelson Carle, General Vehicle Company, Inc.; "The Electric as an Advertising Proposition from the Central Station Standpoint," E. W. J. Proffit, Providence, R. I.

### METHOD OF OBTAINING CUSTOMER'S O. K. ON BODY DESIGN

It is one of the first considerations in preparing a body design for a specified line of trade and for a chassis of a certain load carrying capacity to know fully the nature of the material to be handled. It becomes then as much the fault of the manufacturer as the purchaser to permit the construction of an excessively oversized body that will cause several hundred pounds overload.

Nearly every commercial vehicle manufacturer carries a standard line of body designs. These are made up in quantities, based on previous experience of trade demands. As the manufacturer usually buys these in large numbers, he is enabled to sell a standard size body cheaper than specials. These standard bodies are in the lead or foundation color. The only delay in making an immediate delivery is lettering and putting on the finishing color. Sketches of chassis are made up on paper suitable for blue-printing. These sheets are kept in quantities with the chassis printed from an engraved plate, and are used in preparing the finished sketch. The standard body is traced on the chassis sketch, then the lettering is added, and a blue print is then made of the completed drawing, and sent to the customer for his O. K. This system has been found very necessary, before the work of painting has been started, for when following verbal instructions an important item may be omitted, or a misspelled name occur in the finished work. The blue print is returned with the customer's O. K. or corrections, and not until then is the job sent through.

When the customer is undecided as to what color combination he prefers, a designer's color sketch is submitted, using the exact colors in the lettering and advertising designs, etc., that will appear in the completed job.

This above system is followed by the Autocar Company, of Ardmore, Pa., and has been very useful, not alone to the manufacturer, but as a source of satisfaction to the customer.

# The "Washington Post" Motor Truck Reliability Run

BY S. S. GROGAN, Chief Observer



It would be hard to pick out a route that would better bring to light the shortcomings of any commercial vehicle than the run held last week in Washington, D. C., under the auspices of the Washington Post and known as the Washington Post motor truck reliability run. Every sort of road imaginable, from macadam pike to sandy hills and ordinary country dirt road, interspersed with numerous "thanks-you-mams," were met up with on the 288.7 mile journey through Maryland and Pennsylvania that covered four days, from May 5 to 8, inclusive.

The twenty-one entrants were called upon to meet conditions such as they would hardly be likely to meet with in any kind of service. There was but one thing lacking to make the contest a thorough one and that was a rainy day.

Referee Beecroft, with the consent of the entrants, made two changes in the rules. One permitted the shutting off of motors in case of a blockade due either to the cars in front being tied up or for any other reason. His second ruling was that grease cups and oil feeds could be adjusted at points outside of controls.

The majority of the penalties inflicted were for carburetor trouble and for taking on water outside of controls, though one machine was penalized for being late at a control and another for a burnt-out bearing. The carburetor trouble can more than likely be laid to the fact that as it was a fuel economy test adjustments were made too fine, and when the rarified atmosphere of the mountains was reached the mixture was wrong. The penalties for replenishing water were largely due to the fact that a number of the machines were held up for an hour or more at Middlebrook hill while efforts were being made to get one or two of the cars over this troublesome stretch.

The results were arrived at on the ton mile cost basis. A very careful record was kept of all gasoline and oil used and in addition to this, all road penalties added .1 of a cent per point.

## Results of the Contest

The 33 in. high loving cup, the trophy offered by the "Washington Post," was awarded to the 8000 lb. Vulcan truck,

the largest entrant in the run and the one making the trip with the lowest cost per ton mile. The winners of five other classes were also presented with silver cups.

## Ton Cost Per Mile

The cost per mile per ton of the operation of each truck entered in the run was as follows:

Division 8K—Vulcan, No. 1, .0122.

Division 6K—Rowe, No. 8, .0262.

Division 5K—Atterbury, No. 16, .0172; Lauth-Juergens, No. 12, .0214.

Division 4K—Mais, No. 2, .0220; Witt-Will, No. 4, .0289; McIntyre, No. 10, .0181; Autocar, No. 11, .0183; Atterbury, No. 15, .0185; White, No. 18, .0140.

Division 3K—Little Giant, No. 3, .0277; Wilcox, No. 5, .0260; Atterbury, No. 14, .0270.

Division 2K—Atterbury, No. 13, .0279; White, No. 17, .0238; Atterbury, No. 20, .0417.

Division 1K—Hupmobile, No. 9, .0474; International, No. 19, .0347.

Non-contesting—Brown, .0442; F. W. D., .0525; White, .0276.

The following cars came through with a perfect road score and also passed the technical tests without penalty: Mais, No. 2; Wilcox, No. 5; McIntyre, No. 10; White, No. 18; International, No. 19, and in the non-contesting division the White No. 102.

Owing to the fact that there was but one entrant in class 6-K, no prize was awarded. The Rowe entrant, No. 8, however, completed the run at a cost per ton mile of .0262.

At but one place, Middlebrook hill, twenty-five miles from Washington, did the contestants experience any trouble. This spot was a nasty winding grade with a mixed roadway of limestone rock, with sand pockets at its steepest part. After two or three of the trucks had gone over, those following found it hard work to get traction, and it was only after making a temporary roadway of fence rails and by the use of chains that it could be climbed. One of the official machines, a five-passenger touring car, stalled on this hill and was the cause of the majority of the trouble.



The "Washington Post" Motor Truck Reliability Run

The Autocar No. 11 being started off from Washington; chief checker Jose on left of car, chief observer Grogan at right in right-hand view. This car was fitted with a Parcel Post body and was driven by Norman Althouse, Autocar garage manager.



#### The "Washington Post" Motor Truck Reliability Run

1. Army Ambulances on starting line in Washington. 2. White 3000 lb. car at top of South Mountain. 3. International 1000 lb. car. 4. Main car negotiating Middlebrook Hill. 5. Wilcox 1 ton at noon control, Columbia, Pa. 6. Rows 5000 lb. car waiting for brake tests at Washington. 7. Trucks parked for night at Hanover. 8. Government officials observing White 1500 lb. truck ascending steep grade near Columbia. 9. Autocar going up Blue Ridge Mountains. 10. Horace Chandlee checking in the Hupmobile 600 lb. truck at Baltimore. 11. White 1500 lb. truck ascending Blue Ridge Mountains.



as it prevented those following rushing the grade. The cut in the grade was only wide enough for one machine at a time and it was a case of hold everybody until they could get the man stuck, out, during which time all of the motors were kept running.

Washington to Frederick, 42 miles, proved the worst part of the trip. The road varied from macadam pike to common dirt highway with numerous water brakes on the hills, some of which, though not long, were very steep. However, outside of Middlebrook hill, mentioned above, all made this part of the trip without trouble. This road was such that it would test the mettle of any car that went over it, not even excepting a touring car.

From Frederick to Hagerstown it was plain sailing over good macadam pike, though two mountains had to be crossed, one of them, South mountain, necessitating a three mile climb up a winding road. On this stretch some of the machines were forced to replenish their water supply and the first evidence of carburetor trouble began to make itself evident, the atmosphere being entirely different from that at the starting point.

After a night's rest in Hagerstown, the second leg of the journey to Harrisburg, Pa., 70 miles distant, was taken up. Shippensburg, Pa., was the noon control of this day's run. The road led through the Cumberland valley, and though of good foundation, was rough in spots, "thank-you-ma'ns" and water brakes being scattered along at frequent intervals, or, as one contestant put it, almost every twenty feet. A broken fan belt caused one truck to be penalized on this day's trip, while a gasoline feed pipe proved disastrous to another, and others fell from the clean side of the ledger due to radiator trouble.

Every few miles along this stretch fair sized towns were passed and the people were out in numbers to watch the cars go by. Much interest was displayed at the different controls, and the questions asked were for information not merely to satisfy the curiosity of the onlooker.

At Marietta, Pa., a glimpse, but only a glimpse, of the Susquehanna River was had, for the road immediately led off to the left to begin the mile and a half, eleven per cent. grade with a sharp left turn up Chickee's rock. From the top of this mountain a pretty view for miles in either direction could be had. Cars coming for fifteen miles could be seen with the aid of field glasses. Dropping down the other side of the mountain the cars were in Columbia, the noon control of the third day.

The afternoon's run was over good but dusty roads, with numerous toll gates to prove an annoyance to the afternoon's ride. Every car reached Hanover, the night control, far ahead of its schedule, some of them making the trip in very few more minutes than it would take a pleasure machine. Carburetor trouble and replenishing the water supply was the cause of added penalties to some and the cause of others losing their perfect road score.

From Hanover, Pa., to Washington, 83 miles, was the longest as well as the hardest test for the participants. The first 25 miles to Reisterstown, Md., was over bad going, water brakes being very numerous. There were numerous little hills to be climbed and the water brakes prevented any attempt at rushing them. From this point on, the road continued to improve until just outside of Baltimore it was fine oiled boulevard.

### Friday's Examination

On Friday morning, the cars were tested for brakes, clutch and transmission. The Pilot car paced each truck at its rated speed to a chalk line—one of the brakes was applied and the distance that it took to come to a full stop noted. Over 50 ft. brought forth a penalty. The other brake was then tested the same way. For the transmission test, an official boarded the car and satisfied himself that the car could run on all of its speeds. In order to successfully pass the clutch test, the car was placed with its front wheels against an 8 x 8 in. log, the low gear engaged, the motor speeded up to about 2000 r. p. m. and then the clutch thrown in suddenly. Failure to spin the rear wheels, stall the motor or mount the log would indicate a defective clutch. It is remarkable that all clutches were perfect, all transmissions were operated on all speeds and only three trucks were penalized for not being able to stop within 50 ft. on one brake.

After this the cars were weighed again with their load, which was gravel in 100-lb. sacks, and without it, and then went through the technical examination. At the time of the preliminary weighing in, the front and rear of the machine were weighed, as well as the net weight of the car was taken. This was done at the request of the government officials who accompanied the party. The technical examination showed that there were but very few points marked up against any of the cars for reasons that would be likely to incapacitate them for further service, the worst penalty among the contesting machines imposed being for loose steering gear.

### What the Trial Showed

A number of facts were brought out in this run which were very important. One thing was that all the trucks were able to finish the entire run, some of them with perfect running scores and some not, but regardless of road penalties, every truck deserves a great deal of credit for getting through some particularly bad places. If this run had taken place five years ago, hardly one of the cars could have finished under the same conditions.

Another remarkable fact which proves the great strides which have been made by automobile and accessory manufacturers, is that although the cars came over some of the roughest roads in that section of the country, carrying their full capacity loads, very few blowouts or punctures occurred on those of the cars shod with pneumatics, while those with solids came back with the tires practically in the same condition as when the run started.

The performance of the Autocar, with its Parcel Post body, was particularly interesting. Although carrying its full rated load at all times, it carried an extra passenger for two whole days, and but for the penalizations for filling the radiator out of control, would no doubt have won the trophy. Its cost per ton mile was extremely low, in spite of the penalties incurred. This car was watched with much interest by the government officials, as a number of Autocars are already in the mail service, and it is said that more are to be purchased.

Though the run was held by the Washington Post, it was under the auspices of the general supply committee of the United States government, members of which committee made the trip. Cars were provided for their accommodation, but the majority of them spent their time riding on the different trucks, making copious notes of their performance.

The officials of the run were, Referee, David Beecroft; Representative of the A. A. A., Horace Chandlee; Technical Committee, I. T. Donahue, Charles Brooks and the referee; Starter, William Jose; Assistant Starter, Howard Fisk; Chief Observer, S. S. Grogan; Chief Checker, E. T.

Howard; Checkers, Matt Trimble and H. Kelchner; Fuel Checker, E. H. Vidaud; Weight Checker, Leroy Mark; Pilot, H. E. Duckstien.

The detailed score is as follows:

Name	Driver	Entrant	Price	Capacity	Weight Empty	Weight Loaded	Road Penalties	Clutch	Brake	Tech. Exam.	Gas.	Oil	Cost per Ton Mile
1 Vulcan	H. R. Marshall	Commercial Garage	\$4000	8000	7270	15370	217	0	0	20	70 3/4	5	.0122
2 Mais	Ted Lewis	Mais Motor Truck Co.	3750	3000	6100	9150	0	0	0	0	43 1/2	8 1/2	.0220
3 Little Giant	Floyd Fulton	Motor Truck Corp.	1175	2000	3130	5200	12	0	0	31	34 3/4	9 1/4	.0277
4 Witt-Will	W. D. Griffith	Witt-Will Co.	2250	2240	4400	6685	65	0	0	1	42 1/4	7 1/2	.0289
5 Wilcox	Ray Semmes	Congressional Garage	2000	2000	4240	6260	0	0	0	0	30	14	.0260
8 Rowe	L. I. Walden	Rowe Motor Mfg. Co.	3300	5000	6400	11435	125	0	0	33	84	17 3/4	.0262
9 Hupmobile	H. Reed	Wash. Auto Service Co.	1075	800	2300	3120	8	0	0	0	25 1/4	4	.0474
10 McIntyre	J. W. Smith	W. H. McIntyre Co.	2300	3000	4340	7575	0	0	0	0	32 1/2	12	.0181
11 Autocar	N. C. Althouse	Autocar Sales & Serv. Co.	2200	3000	4060	7125	35	0	0	1	35 1/2	7 1/2	.0183
12 Lauth-Juergens	Ray Graham	Lauth-Juergens M. C. Co.	2800	4000	5650	9715	132	0	0	1	51	18	.0214
13 Atterbury	Chas. Earl	Atterbury Motor Car Co.	1500	1500	3120	4720	16	0	0	15	27	5 1/2	.0279
14 Atterbury	G. H. Kelly	Atterbury Motor Car Co.	2000	2000	4100	6150	69	0	0	1	37	3	.0270
15 Atterbury	W. Franklin	Atterbury Motor Car Co.	2300	3000	4400	7475	123	0	0	1	35	8	.0185
16 Atterbury	C. E. Shaw	Atterbury Motor Car Co.	2650	4000	5550	9680	32	0	0	1	48 1/2	2	.0172
17 White	W. Cyphers	The White Co.	2250	1500	3600	5175	30	0	0	15	22 1/2	6	.0238
18 White	G. Breitweiser	The White Co.	3150	3000	4920	7950	0	0	0	0	27 1/2	5 1/2	.0140
19 International	B. Robertson	H. B. Leary, Jr.	1025	1000	2600	3675	0	0	0	0	24 1/2	1 1/2	.0347
20 Atterbury	Lee Logan	Atterbury Motor Car Co.	1500	1500	3160	4680	160	5	0	0	34 1/2	18	.0417
100 Brown	C. Mudd	U. S. Medical Corp.	2500	1500	4200	5500	23	0	0	2	35	14	.0442
101 F. W. D.	J. V. Cummins	U. S. Medical Corp.	3600	1500	4960	6200	351	0	24	151	51	6 1/4	.0525
102 White	Joe Judge	U. S. Medical Corp.	2568	1500	4100	5350	0	0	0	0	26 1/2	6	.0276

### Personal Items

**Robert W. Ingersoll**, sales manager of the Stewart Motor Corporation, Buffalo, N. Y., has resigned.

**Harvey M. Briggs** has succeeded Otto R. Bieler as engineer of the Lord Baltimore Motor Car Company.

**F. N. Schwab** has been appointed manager of the Chicago branch of the Speedwell Motor Car Company.

**M. A. Magee** has been promoted to the position of sales manager of the Motz Tire & Rubber Company, Akron, O.

**J. R. Coleman** has resigned as chief engineer and designer of the Atterbury Motor Car Company, Buffalo, N. Y.

**E. C. Fink** has been appointed sales manager of the International Motor Company, with headquarters in New York.

**R. W. Hutchinson, Jr.**, advertising and publicity manager of the International Motor Company, New York City, has resigned, to take effect June 1st.

**B. D. Gray** was recently elected vice-president and general manager of the Hess-Bright Manufacturing Company, of New York, Philadelphia and Chicago.

**George R. Moran**, formerly chief engineer for Barthel, Daly & Miller, has been appointed assistant general manager of the Suspension Roller Bearing Company, Sandusky, O.

**A. W. Morris**, formerly with the Wetherill Finished Castings Company, Philadelphia, Pa., has been appointed factory manager of the Dcehler Die Casting Company, Brooklyn, N. Y.

**G. H. Bryan**, formerly advertising manager for the Franklin Automobile Company, has become assistant advertising manager for the Locomobile Company of America, Bridgeport, Conn.

**E. H. Broadwell**, formerly vice-president of the Hudson Motor Car Company, has been elected vice-president of the Fisk Rubber Company. He had previously been connected with this company.

**Elisha S. Williams**, president of the United States Tire Company, will also act as general manager of the company, succeeding J. M. Gilbert, who resigned to become president of the Lozier Motor Company.

**E. S. Kelly** has resigned the presidency of The Kelly-Springfield Motor Truck Company because of ill-health, but continues as chairman of its board of directors, has nominated J. L. Geddes to succeed to the presidency.

**Samuel M. Cooley** has been appointed general manager of the Prest-O-Lite Company. Mr. Cooley has been connected with the company for several years, and the last two years has been assistant general manager.

**Edgar C. Neal**, formerly president of the Buffalo Wholesale Hardware Company, has become vice-president of the Atterbury Motor Car Company, of Buffalo, N. Y., and will take an active interest in the Atterbury management.

**J. B. Sullivan**, formerly connected with the Chase agency at St. Louis, and N. E. Byers, from New York City, both experienced motor truck men, have joined the sales force of the Commercial Motors Company, Los Angeles, Cal.

**Lippard-Stewart Motor Car Company**, Buffalo, N. Y., has elected the following Directors: August Becker, E. J. Barcalo, Wilbur F. Reynolds, C. S. Dahlquist and Chas. Valone. Officers elected are: August Becker, President and Treasurer; E. J. Barcalo, Vice-President; J. C. Miller, Secretary; C. S. Dahlquist, Chief Engineer; Wilbur F. Reynolds, Sales Manager.

### Capital Increases and New Incorporations

**Service Motor Car Company**, Wabash, Ind., has increased its capital from \$125,000 to \$250,000.

**Suspension Roller Bearing Company**, Sandusky, O., has increased its capital stock from \$250,000 to \$350,000.

**Wayne Oil Pump & Tank Company**, Fort Wayne, Ind., has increased its capital stock from \$250,000 to \$300,000.

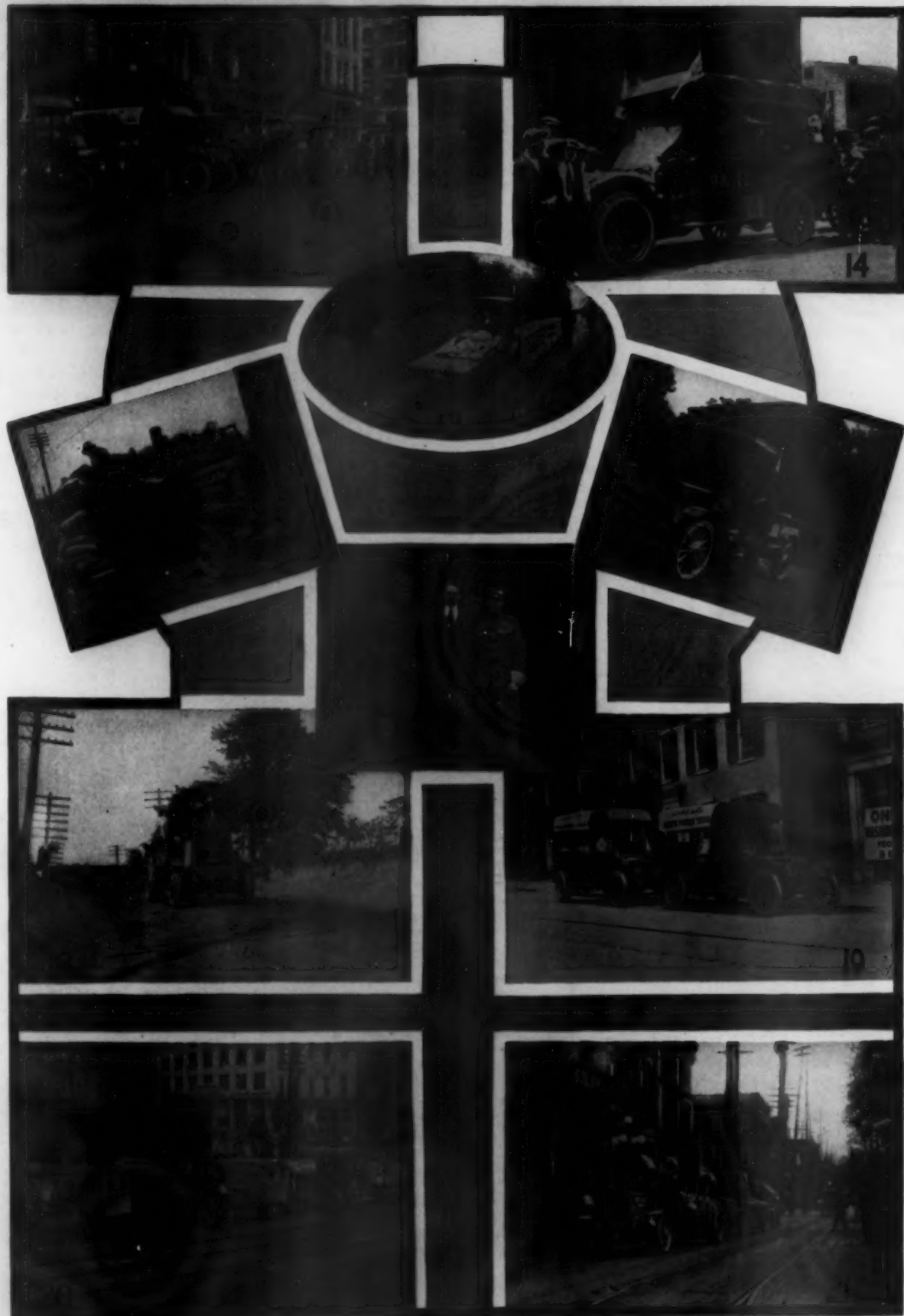
**Lovell-McConnell Manufacturing Company**, Newark, N. J., has increased its capital stock to \$2,000,000, to provide for its rapidly growing business.

**Indiana Motor Truck Sales Company**, New York City, has been incorporated to manufacture and repair autos, with a capital stock of \$10,000. L. C. Knoegel, 100 Broadway, and others, incorporators.

**Wehl Motor Car Company**, Detroit, Mich., has been incorporated with \$500,000 capital to manufacture commercial cars. The incorporators are Geo. H. Wahl, J. E. Hofweber, A. J. Hofweber and M. Kratchwill, all of Lacrosse, Wis.

**Duplex Power Car Company**, Charlotte, Mich., makers of commercial motor cars has been reorganized, and the following officers were elected: President, F. P. Town; treasurer, J. H. Town; secretary, M. J. Lamson. Additional directors, F. L. King, J. H. Brown, Geo. A. Williams and H. H. Brown.

**The Warner-Detroit Motor Works**, 1615 Dime Savings Bank Building, Detroit, Mich., has recently been organized and will build 4 and 6-cylinder motors for pleasure and commercial car use. The new company contemplates building 15,000 motors during the next eighteen months.



**The "Washington Post" Motor Truck Reliability Run**

12. Trucks parked in Harrisburg. 13. McIntyre going up Middlebrook Hill. 14. Brown Army Ambulance at Columbia. 15. Vulcan unloading gravel bags. 16. Guarding the trucks at the official garage, Washington. 17. Checking in the Atterbury No. 15. 18. Mais ascending a grade. 19. The two Whites at Shippensburg. 20. Cars parked at Hagerstown. 21. Vulcan and McIntyre ready to start from Harrisburg.



## DENATURED ALCOHOL AS A DECARBONIZER AND ENGINE CLEANSER

A paper, under the title "Denatured Alcohol As A Decarbonizer And Engine Cleanser," was read by Joseph A. Anglada, M. E., chairman of the Metropolitan Section of Society of Automobile Engineers at a meeting of said Society, recently held at its rooms, 1790 Broadway, New York City.

The writer concluded a series of experiments for the purpose of ascertaining the action of denatured alcohol in automobile engine cylinders, in which there were carbon deposits. The paper treated with denatured alcohol, causes of carbon deposits, necessity for removing deposits, the nature of the experiments and an outline of the experiments.

From the results of those experiments the following conclusions were arrived at:

1. Denatured alcohol is an efficient decarbonizer for the automobile type of engine.
2. It does not injuriously affect the surfaces of the metals with which it comes in contact.
3. Heat is not necessary when using denatured alcohol as a decarbonizer.
4. Heat accelerates the action of denatured alcohol when used as a decarbonizer.
5. Denatured alcohol when introduced in the combustion space of an automobile cylinder which is at the working temperature of the engine, will loosen the carbon deposits so as to permit the deposit to become separated from the walls of the combustion space and pass out of the cylinder with the exhaust gases when the engine is run.

6. The best results from the use of denatured alcohol as a carbon remover, are obtained when the combustion space of a hot engine is entirely filled with liquid denatured alcohol and permitted to soak for a period not less than six hours.

7. Denatured alcohol will act as a carbon remover when the engine is cold, provided the liquid denatured alcohol is in contact with the carbon-covered surfaces. The action of denatured alcohol under these conditions is about half as rapid as when the engine is hot.

8. The action of denatured alcohol as a carbon remover when introduced in small quantities into the combustion space of a cold automobile engine is positive but slow.

9. Where the fit between the piston rings and cylinder walls is imperfect, denatured alcohol will leak past the pistons into the crank case and cause the oil in the crank case to become unfit for use for lubricating the engine. However, when a sufficient amount of denatured alcohol has been added to this oil and circulated through the lubricating system of the motor, for a very short period in order to obviate the possibility of damaging the wearing surfaces of the engine, denatured alcohol acts as a cleansing agent, as evidenced by the unusual amount of foreign matter withdrawn with the denatured alcohol—treated oil.

10. Due to the cleansing action of denatured alcohol as noted in the preceding conclusions, an engine which has been in service for an extensive period, will show a marked increase in operating efficiency when thoroughly treated with denatured alcohol.

## Trade Changes and Factory News

**Transit Motor Car Company**, Louisville, Ky., has changed its name to the Transit Motor Truck Company.

**Morgan & Wright**, Detroit, Mich., are erecting another addition to their plant, 174 x 257 ft. and three stories high.

**Kelsey Wheel Company**, Detroit, Mich., has acquired a four acre tract in Windsor, Ontario, on which it will soon erect a plant.

**Royal Equipment Company**, manufacturer of "Raybestos," has moved to new quarters at corner of Railroad Avenue, Bridgeport, Conn.

**Bauer Auto & Truck Company**, 1110-12 C Street, Washington, D. C., has leased premises 1608 Fourteenth Street, N. W., and will locate there as soon as improvements are completed.

**The Jamesville Manufacturing Company**, of Jamesville, N. Y., manufacturer of control lever sets, brake equalizers, yoke and fender irons, etc., has recently moved to Batavia, N. Y.

**Buick Motor Company**, Flint, Mich., has purchased property and will build a large assembling plant at New Orleans, to take care of the South American trade, which is growing very fast.

**E. B. Van Wagoner Company**, Syracuse, N. Y., have built an addition to their factory at Fayetteville, a suburb of Syracuse, and have removed their offices from Syracuse to the factory at Fayetteville.

**Goodrich, B. F. Company**, has been deeded 17 acres of land at St. Catharines, Ont., for a Canadian tire factory, which it is said will employ over a thousand men.

**Coronet Manufacturing Company**, Wade Building, Cleveland, O., is now marketing and manufacturing the Coronet Hubodometer, which was formerly controlled by the Service Recorder Company.

**Standard Motor Truck Company**, Detroit, Mich., A. Fisher has bought half interest in the company, which has been reorganized with Mr. Fisher as vice-president and treasurer, succeeding O. M. Mulkey. The new officers of the company are Howard Wilcox, president; A. Fisher, vice-president and treasurer; A. W. Ackerman, secretary; F. J. Fisher, assistant treasurer.

## KISSEL ORGANIZES A GIGANTIC PACIFIC COAST SELLING BRANCH

A Pacific Kissel Kar branch has been organized in Los Angeles, Cal., with a capital stock of \$500,000. Among the organizers are George A. Kissel, of the Kissel Kar Company; W. L. Hughson, H. K. Butterfield, vice-president of the Kissel Kar Company; G. W. Emmons, president of the Standard Gas Engine Company; E. Rodgers Stearns, vice-president of the Standard Motor Car Company.

The new corporation will handle the entire Kissel Kar line, both pleasure and commercial vehicles. It will also handle

the Ford cars in Los Angeles and San Francisco, the Federal commercial cars for the entire State of California, and the Baker electric cars for southern California. In addition to the Los Angeles and San Francisco branches there will be branches at all the principal points from San Diego to Vancouver, as well as in Honolulu.

## CASH PRIZES FOR BEST WINDOW DISPLAY

The Emil Grossman Company, of New York City, well-known maker of the Red Head Spark Plug, believes that an attractive window display helps materially in selling goods and as an incentive is offering cash prizes of \$100, \$75, \$50, \$25, \$15 and five \$5 prizes for the best window display in which Red Plugs are featured. Every jobber, car or motorcycle dealer and garage man is eligible. All window displays must be photographed, not less than 8 x 10 in., and must be sent in before midnight, July 4th. One may enter as many photographs of different window displays as possible.

## COMMERCIAL CAR AGENCIES WANTED BY:

**Beguelin-Buschart Motor Car Company**, of 4386-90 Olive Street, St. Louis, Mo., wants gasoline commercial cars of 1000 to 2500 lbs. capacity, to sell at \$700 to \$1500.

**G. A. Adams**, of Coolidge, Ga., wants gasoline commercial cars of 20 to 30 h. p., to sell at \$400 and up.

# THE COMMERCIAL CAR JOURNAL

Vol. V.

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GEO. H. BUZBY.....Vice President  
C. A. MUSSELMAN.....Sec'y and Treas.

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C. A. MUSSELMAN.....	4203 Pine St., Philadelphia, Pa.

Known bondholders, mortgagees, and other security holders, holding one per cent or more of total amount of bonds, mortgages, or other securities: NONE.

(Signed) C. A. MUSSELMAN, Business Manager.

Sworn to and subscribed before me this 13th day of March, 1913

(SEAL)

(Signed) HARRY SMITH, Notary Public.

(My commission expires February 21, 1915.)

Note:—In regard to Section 2 of the Act mentioned above, the Chilton Company does not accept payment, directly or indirectly, for any editorial or other matter printed as news.

### WHERE IS THE MISTAKE?



HE statement was recently made by a well-known salesman in one of the largest cities of the East that he did not believe that in his town anything could live except a branch. He was answered by a man in charge of the service department of one of the largest truck makers, that he agreed with him, but would go a step further, and say that nothing but a large branch could survive. Numerous talks with commercial car agents, branch managers and those engaged in the retail sale of commercial cars brings forth very often the opinion that the handling of commercial cars is too expensive to be successfully carried on by the ordinary agent.

If these are the actual conditions, somewhere a mistake is being made. The question is, where?

Granting that these statements are even approximately true, and admitting that it is extremely difficult for a retail agency to make sufficient money to warrant its existence. Why is this the case? The answer is simple. Service is the rock upon which the retail agency founders. Inability to give the service which is being given by the large factory branches.

The user in many of our large cities has at last been educated to the point that he cannot be induced to buy any large number of trucks except from a branch or a large agency run by a group of moneyed men, who are able to maintain an efficient modern service station, such as it is out of the question for the small agent even to dream of. Even if the service end were entirely self-supporting after once being established, the initial cost would be prohibitive.

Is there not grave danger that the makers can go too far in this matter of service to customers, especially as this has a tendency to make the user depend too largely upon the maker or branch, and not enough on himself?

We will concede that the service department, properly conducted, breaks even, but is it wise to so accustom the user to having his every minor difficulty diagnosed and doctored until he is not able to prescribe for himself? What is to become of the agent who cannot give such service? What is the result when such a pampered user comes into possession of trucks not backed by this same service?

Is it not far wiser to maintain an educational campaign in connection with the service department, with the avowed aim and end in view of making the customer self-reliant and able efficiently to care for his own equipment. The latter method is already being worked out with great success by at least one well-known maker of commercial cars. In this instance some three times the number of cars are now on the road than formerly, yet very much less help is now required in caring for them in the service department. This proves that the users are profiting by their training and are looking after themselves.

The question arises: Are the truck makers, through their branches, giving too much for the ultimate good of the purchaser, and indirectly the industry as a whole? This question is one which, in view of the opinions expressed by so many men connected with retail sales of commercial cars, should bear careful analyzing.

We do not say that it costs more to sell commercial cars in every city than the agent can stand, as there is an enorm-

ous difference between individual cities and between individual agents. Some are doubtless giving too much free service, which in the nature of things cannot be continued for long by any agency or branch, and this word of warning is given for the purpose of calling attention to the need of educating the user as quickly as possible to become entirely self-reliant.

In no other business is so much money represented in men and equipment to assist purchasers as in the commercial car industry, and although owing to the newness of the use of trucks a certain amount of assistance must necessarily be given the novice, it does not follow that it is wise to carry this to an extreme.

### FUEL SITUATION DEMANDS LOW-GRADE FUEL TESTS



THE fuel situation is gradually growing more tense and attracting more wide-spread attention. The truck manufacturers are apparently depending upon the carburetor makers or independent designers or inventors for the necessary improvements.

Their inaction in this matter is apparently similar to the course followed in the case of the engine starters. Independent companies or accessory makers were first to place starters on the market, and the manufacturers suddenly found that owing to public demand they must at once install them. To do this properly, proved extremely difficult for many a maker.

In the same way, fuel burning devices, vaporizers, atomizers or carburetors, for consuming low grade oils, have not as yet been placed on the market by the truck manufacturers, but already from other sources, devices for making it possible to burn low grade fuels in the ordinary truck motor, are being brought forward. As the manufacturers seem willing that these changes should come from an outside source, we believe there should be instituted at as early a date as possible, some thorough tests on kerosene and other low grade oil burning devices; with suitable prizes of sufficient value to induce carburetor makers, inventors and designers, to enter their devices in the competition. Such tests would undoubtedly bring to light several arrangements which are more or less efficient.

Tests on the devices themselves could well be conducted in a laboratory, so as to show the actual power generating possibilities in connection with various truck motors. A technical examination could then be made of the engines and penalties imposed, based on horse power developed, flexibility, overheating, quantity of carbon deposited, etc.

In addition to such laboratory tests of engines fitted with low grade fuel vaporizing devices, there might be held road tests of complete trucks, all being supplied with commercial kerosene of the same grade; in other words, it would be very interesting and instructive at this time, for truck purchasers and prospective users to know which of the cars now on the market will give the best performance using the low grade fuels, which must be resorted to within the next few years.

## Steel and Rubber Markets

### Steel Prices Firm

Steel prices are practically the same as they were last month. The mills have not shown any abatement in activities so far, but decrease in bookings has been very marked during the first ten days of May. The quotations of May 10th were:

Bessemer steel, per ton, mill	29 00	a29 50
Open hearth, per ton, mill	29 00	a30 00
Sheet bars, per ton	30 00	a31 00

#### STEEL BARS

Steel, soft base, half ex., tidewater ..... 1 56 a 1 61  
The above prices are at tidewater in carloads and larger lots. For quantities less than 2,000 lbs., but not under 1,000 lbs., \$2.00 per ton additional is charged, and less than 1,000 lbs., \$5.00 per ton additional.

#### SHEETS

The following prices are for 100-bundle lots and over f. o. b. mill; smaller lots \$2.00 per ton higher.

Gauge—	Black	Galv.	Gauge—	Black	Galv.
Nos. 22 & 24	2 20	3 15	No. 28	2 35	3 50
Nos. 25 & 26	2 25	3 25	No. 29	2 40	3 70
No. 27	2 35	3 35	No. 30	2 45	3 90

### IRON AND STEEL AT PITTSBURGH

Bessemer iron	18 15	a	...
Bessemer steel, f. o. b. Pitts.	29 00	a	310 00
Muck bars	31 00	a	...
Skelp, grooved steel	1 45	a	1 50
Skelp, grooved iron	1 75	a	1 80
Ferro-manganese (80 per cent.), seaboard	.64	a	65 00
Steel, melting scrap	14 25	a	14 50
Steel bars	1 40	a	1 45
Black sheets, 28-gauge	2 35	a	...
Galvanized sheets, 28-gauge	3 50	a	...
Blue annealed, 10-gauge	3 50	a	...
Tank plates, 3/4-inch and heavier	1 45	a	1 50
Wire rods	30 00	a	31 00
Wire nails	1 80	a	...
Plain wire	1 60	a	...
Cut nails	1 75	a	1 80
Barbed wire, painted	1 75	a	...

### Crude Rubber Up to 93

Since our last writing, April 11th, crude rubber has increased from 78 to 93 cents, and according to present indication prices will continue to rise both here and abroad.

A good demand prevails on both sides of the water. Quotations on May 10th were:

Up-River—		Africans—	
Fine	93 a 94	Maasai red	80 a ..
Coarse	61 a 62	Red C'go	Nominal
Island Fine—		B'k C'go	80 a ..
Coarse	41 a 42	Soudan—	
Cameta	45 a 46	Niggers	Nominal
Caucho—		Accra, lb.	41 a 42
Ball	60 a 61	Gambia, prime	55 a 56
Centrals—		East India—	
Corinto	58 a 59	Smk. sh'ts	85 a 86
Esmeralda	59 a 60	Ceylon, bis. and sh'ts.	83 a 84
Guatemala, slab	46 a 47	Pale Crepe	84 a 85
Mestican—		Borneo I	61 a 62
Scrap	57 a 58	Borneo II	49 a 50
Strips and scrap	55 a 56	Borneo III	38 a 40
Guayule	Nominal	Pontianac—	
Balata, sh't	72 a 73	Prime plantation	8 a ..
Ciudad, b'k	50 a ..	Palembang	7 a ..
Trinidad, b'k	Nominal	LONDON, May 10.—Closing:	

Up-river fine, 38 10d; up-river coarse, 28 7 1/2d; pale crepe, 38 5 1/2d, basis first latex. Prices are for spot and nearby. Market closed firm and active.

#### SCRAP RUBBER—DOMESTIC

Boots and shoes	10 a	10 1/2
Tires—		
Automobile	10 a	10 1/2
Bicycle, pneumatic	5 1/2 a	5 1/2
Wagon and carriage, solid	9 1/2 a	9 1/2
Hose, steam, fire	1 1/2 a	2 1/2

### NEW YORK ADVERSE LEGISLATION DOES NOT PASS

The New York Legislature, which adjourned on May 3rd, passed but one bill of importance to the automobile world, namely, the McClelland-McGrath measure. This, after due changes, still contains a requirement for the licensing of all drivers of automobiles without examination, except chauffeurs. The license fee for the latter is reduced from \$5 to \$1 without yearly renewal. The Secretary of State has authority to suspend or revoke a license.



## Conventions of Interest to the Trade

May 19-20—Convention of Arkansas Engineering Society, Little Rock, Ark.

May 19-21—National Association of Manufacturers will convene at Detroit, Mich. Headquarters, Hotel Pontchartrain.

May 19-22—Convention of National Association of Retail Grocers, St. Louis, Mo. C. H. Kraas, Chairman.

May 20-22—American Society of Inspectors of Plumbing and Sanitary Engineers at Louisville, Ky. Jas. E. McGrath, Louisville, Ky., is Secretary.

May 20-22—South Dakota Retail Merchants' and Hardware Dealers' Association will hold convention at Redfield.

May 20-23—New Mexico Retailers' Annual Convention at Roswell.

May 21-23—Thirty-third Annual Meeting of the Iowa Funeral Directors' Association, at Davenport. Charles Emerson, of Creston, is Secretary.

May 24-June 1—Industrial Exposition at Yonkers, N. Y. Yonkers Merchants' Association.

May 26-28—Electrical Supply Jobbers' Association will hold convention at Chicago, Ill.

May 26-31—Georgia Retail Hardware Association, Atlanta, Ga.

May 27-28—15th Annual Convention of Texas Grain Dealers' Association, at Fort Worth. T. G. Moore is president, and T. G. Gibbs, Secretary. Secretary's office, First National Bank Bldg.

May 27-28—National District Heating Association will hold 1913 Convention at Indianapolis, Ind. R. D. DeWolf, of Rochester, N. Y., is President, and D. L. Gaskill, of Greenville, O., is Secretary and Treasurer of the Executive Committee.

June—Convention of South Texas Wholesale Grocers' Association, Galveston, Texas. A. T. Lange, Galveston, Secretary.

June—Convention of American Iron, Steel and Heavy Hardware Association, Buffalo, N. Y. F. C. Deming, Secretary.

June 2-4—12th Annual Convention of State Association of Master Plumbers of California, at Santa Barbara, Calif. Headquarters at Hotel Potter. John S. E. Firmin, 120 Page Street, San Francisco, Secretary.

June 2-5—National Electric Light Association will hold convention at Chicago, Ill.

June 3-5—Michigan State Firemen's Association will convene at Cheboygan, Mich.

June 4-5—New York State Laundrymen's Association will hold convention in Albany, N. Y. J. E. Kelso is chairman of committee.

June 4-6—South Dakota Funeral Directors' Association will hold convention in Aberdeen, S. D.

June 4-6—Interstate Oil Men's Superintendents' Association will convene at Atlanta, Ga.

June 4-6—7th Annual Convention of the National Wholesale Grocers' Association, at Atlantic City, N. J. Geo. E. L. Litchy, President.

June 5-6—Convention of National Hardwood Lumber Association, Chicago, Ill.

June 5-6—Convention of Northern Minnesota Development Association, at Hinckley, Minn.

June 5-7—Annual Convention of the Colorado State Association of Master Plumbers, at Colorado Springs, with headquarters at the Antlers Hotel. Peter Menzies, Denver, Secretary.

June 5-7—Tobacco Association of United States will hold convention at Richmond, Va.

June 5-7—Colorado State Association of Master Plumbers, annual convention, Antlers Hotel, Colorado Springs, Colo.

June 9-15—Convention of National Association of Sheet Metal Contractors, Masonic Temple, Washington, D. C. J. A. Pierpont, Secretary.

June 10-12—The American Steel and Hardware Association will convene at Buffalo, N. Y. Harry Saunders, of the Chamber of Commerce, Secretary of the committee in charge of preparations.

June 10-12—Annual Convention of North Dakota Firemen's Association, Bismarck, N. D. H. L. Reade, Secretary.

The list of conventions given herewith is published each month so that commercial car manufacturers can communicate with the proper authorities with the idea of arranging to give lectures, illustrated talks, statistics, etc., to show the advantage of motor trucks in these various lines; also possibly to show and demonstrate their cars.

June 10-12—18th Annual Convention of the New York Volunteer Firemen's Association. Arthur Middlebrook is member of the advertising and publicity committee.

June 11-13—Convention of Oil Mill Superintendents' Association, Little Rock, Ark.

June 13—Convention of Mine Inspectors' Institute of America, Birmingham, Ala.

June 16—New Jersey State Association of Master Plumbers, annual convention, Camden, N. J.

June 17-18—National Expeller Cotton Seed Crushers' Association will convene at Oklahoma City, Okla. D. G. Dumas, of Atlanta, Ga., is secretary and treasurer.

June 17-19—National Association of Master Plumbers, annual convention, Bellevue-Stratford Hotel, Philadelphia, Pa. Charles F. Murphy, 15 Old Broadway, N. Y. City, Secretary.

June 17-19—Iowa Retail Merchants' Association will hold convention at Council Bluffs.

June 23-25—Retail Merchants' Association of Texas will hold 15th annual convention at Beaumont, Tex. W. J. Edgecomb, Secretary.

June 23-26—Master Steam and Hot Water Fitters' Association, annual convention.

June 24-26—Convention of National Hay Association, Chicago, Ill. J. V. Taylor, Secretary.

June 24-26—State Firemen's Association will convene in Abbeville, S. C. Local Chief, T. V. Elgin, President of the Association, is preparing for the event.

July 3-4—Annual Convention of the Tri-County Firemen's Association at Northville, N. Y. Dr. C. J. Robinson, M. E. Roberts are on the committee in charge.

July—Convention of National Hotel Keepers' Association, Minneapolis, Minn. R. H. Hawkes, Secretary.

July 7-14—Carolinas Retail Hardware Dealers' Association Convention, Richmond, Va. T. W. Dixon, Secretary, Charlotte, N. C.

July 8-9—State Convention of Oklahoma Retail Dealers' Association, at Stillwater, Okla.

July 7-10—Canadian Forestry Association will hold convention at Winnipeg, Manitoba. James Lawler is chairman of committee in charge, and secretary of association; headquarters, Canadian Bldg., Ottawa.

July 8-10—North Dakota Retail Merchants' Association will hold convention at Fargo.

July 10—National Electrical Contractors' Association will hold convention at Chattanooga, Tenn.

July 21-24—Convention of National Cleaners' and Dyers' Association of the United States, and Canada, Omaha, Neb. Rome Hotel.

July 22-24—Central New York Volunteer Firemen's Association will convene at Cortland, N. Y. James L. Murphy, President.

July 21-26—North Dakota State Fair, Grand Forks, N. D.

July 22-25—Iowa State Firemen's Association will hold convention at Perry, Ia. Chief Dan Flanagan, Perry, Ia., in charge.

July 22-25—Livingston County Fair, Chillicothe, Mo. A. M. Shelton is Secretary.

July 24-25—Southwestern New York Volunteer Firemen's Association will convene in Bolivar, N. Y.

July 24-26—Ohio Builders' Supply Association will hold convention at Cedar Point, Ohio.

July 29-31—State Convention and Tournament of Firemen, at Toledo, O. H. Willhauck is Corresponding Secretary.

August—Retail Merchants' Association of Pennsylvania, will hold convention at Warren, Pa. J. W. Kendall, Chairman.

August—Cotton Carnival, Galveston, Tex. Galveston Commercial Association, F. M. Lege, Jr., chairman.

August 1-30—Greater New York Fair and Exposition to be held at Empire City Park. John A. Murkin, Poultry Heidelberg Bldg., Broadway and 42nd St., N. Y. City, is Manager.

August 5-7—Annual Convention of Michigan Association of Rural Letter Carriers, at Grand Rapids, Mich.

August 11-13—Wisconsin Retail Grocers' and General Merchants' Association will hold convention at Racine.

August 14-16—National Electric Lighting Association will hold convention at Macon, Ga. W. L. Southwell, of Macon, is Chairman of Executive Committee.

August 18—American Florists' and Ornamental Horticulturists' Society will hold convention at Minneapolis, Minn. J. K. M. L. Farquhar, of Boston, Mass., is President.

August 19-22—Cortland County Fair, N. Y. W. J. Greenman is Secretary.

August 28-29—Helena Flower Show Association will hold show in Helena, Mont. Dr. L. M. Rheem, Secretary of Commercial Club, is interested.

August 28-29—Central New York Horticultural Society will hold show in New Hartford, N. Y.

September 1-6—Fire Chiefs' Association will hold 41st annual convention in New York City. Exhibits will be housed at Madison Square Garden. James McFall, Secretary, Roanoke, Va.

September 3-13—Retail Grocers' Association Show, San Jose, Cal. A. F. Emlay, Secretary.

September 10-12—Annual Convention of Pennsylvania Millers' State Association, to be held at St. Charles Hotel, Atlantic City, N. J.

September 11-13—State Fair, Mankato, Minn., under auspices of Mankato Fair Association. Charles T. Taylor is President.

September 22-26—Annual Convention of American Association of Master Bakers, in New York City. Charles E. Abbott, 236 Eighth Ave., is Chairman.

October—Convention of International Dry Farming Congress, Tulsa, Okla.

October—National Hardware Jobbers' Association will hold convention in Denver, Colo. George Tritch, Denver, in charge.

October 1-5—Rappahannock Valley Agricultural and Mechanical Fair Association will hold fair in Fredericksburg, Va. A. P. Rowe, President.

October 4-11—Electrical and Industrial Exposition will be held in Denver, Colo., by the Colorado Electrical Club. L. M. Cargo, 1052 Gas & Electric Bldg., is chairman of committee.

October 13-18—National Fire Prevention Conference in Philadelphia, Pa. Powell Evans, Chairman, Room 420, City Hall, Philadelphia.

October 13-19—American Foundrymen's Association will hold convention at La Salle Hotel, Chicago, Ill.

October 15-16—Grain Dealers' National Association will hold convention at New Orleans, La.

October 20-26—Georgia State Fair. M. V. Calvin, Secretary, Macon, Ga.

October 21-24—Wichita (Kans.) Business Men's Association preparing for Trans-Mississippi Congress, to be held in Wichita.

December 10-12—Wisconsin Retail Implement and Vehicle Dealers' Association will hold convention at Milwaukee, Wis. G. F. Borchardt, South Milwaukee, Wis., President.

December 28-Jan. 3—Florida Fanciers' Association will hold annual show. A. R. McRae is President of the Association.

February 9-14 (1914)—Retail Hardware Association of Maryland, Pennsylvania, Delaware and New Jersey will hold convention at Baltimore. Md. W. P. Lewis, Huntingdon, Pa., is Secretary.

**Ferromatic Rubber & Manufacturing Company**, Cleveland, O., makers of spring tires, are in the hands of a receiver.

**Coates Commercial Car Company**, Goshen, N. Y., has had judgment filed against it for the rent of the office which it occupied at 949 Broadway, New York, amounting to \$210.46.

**Findlay Motor Company**, Findlay, O., which has been in the hands of a receiver for several years, has been adjudged bankrupt, and N. W. Bright, ref-

eree, has called a meeting of creditors on May 20th, at 330½ S. Main Street, Findlay, O.

**The Schacht Motor Car Company**, of Cincinnati, O., has been placed in the hands of John F. Dietz, one of its stockholders, as receiver. This action was brought about by the disagreement among the officers of the company.

It is stated that the assets of the company are approximately \$600,000, and that the liabilities will not exceed \$175,000. It is the object of the receivership to

continue the business and an order from the court has been secured to this effect, and it is expected that the Schacht Company will soon again be on its feet.

**Victor Motor Truck Company**, Buffalo, N. Y., has made an assignment to Marc W. Comstock. It is stated that this action was taken on account of friction among members of the company. The assignee states that their liabilities are between \$10,000 and \$12,000, and that the assets are many times this amount. It is the intention to reorganize the company.

## The Passing of the Horse

A costly and inefficient hay-fed motor that is being replaced by an economical and efficient one fed on gasoline.—By Herbert N. Casson, in the "Ford Times"

Exit the horse—enter the power-driven vehicle. There you have, in eight words, a definition of the power revolution that is now taking place in the cities and on the farms of the United States.



The horse, like the buffalo, has had his day

The horse has become unprofitable. He is too costly to buy and too costly to keep.

His price has increased 143 per cent. in the last ten years. The cost of his feed, his harness, his barn, his hostlers, has increased.

Nothing that concerns the horse has remained the same, except his power. He is not one pound stronger today than he was thirty years ago, in the days of his cheapness.

Men work more for horses than horses work for men.

A government report announces that the one trifling item of horse chores requires twenty-seven minutes a day per horse. This is equal to twenty days a year per horse, allowing an eight-hour day. Moreover, it is a sort of labor that can never be improved. It is dirty, disagreeable drudgery, not in any degree like the skilled work of a mechanic or chauffeur or tractioneer. It is personal service rendered to lower animals by men. More degrading still is the work performed by thousands of street cleaners, who would be unnecessary in horseless cities. All these men would be more content and more useful if they were engaged in cleaning trucks, tractors and automobiles.

Also, among the human servants of the horse, we must count the harness-makers, the tanners, the buckle-makers and whip-makers. We must count the stable builders and the men who make the raw materials of stables. We must count the veterinary surgeons and the blacksmiths. Merely the horseshoes that were hammered on by American blacksmiths last year contained enough iron to make forty thousand tractors.

We must count the hay-makers and hay-balers and all the men who handled, last year, 73,000,000 tons of hay. If they had devoted the same time and the same land to the raising of wheat and potatoes and corn, they would have had enough extra food to supply the cities of New York, Philadelphia and Chicago.

As Edison has said, a horse is the poorest motor ever built. He eats ten pounds of food for every hour he works. He eats 12,000 pounds of food a year. He eats the whole output of five acres. And yet his thermal efficiency is only 2 per cent.

A horse is cumbersome, too, as well as inefficient. He requires 750 cu. ft. of barn. He and his feed require at least 3000 cu. ft.

Both human muscle and horse muscle are too weak for the labors of to-day. Both men and horses are too feeble and too slow for this age of speed and tonnage.

The average horse-wagon or horse-truck, in farm and city, is too small.

It has been estimated the total cost of hauling wheat to market—from farm to railroad station—is more than \$35,000,000 a year in the United States. The total cost of hauling all farm products from farm to town is \$130,000,000. We must add to this the cost of hauling from the railroad to the flour-mill, the commission merchant, the retailer and the consumer. The nearer we get to the consumer, the smaller is the load and the heavier is the cost.

We have solved the long-haul problem. One ship to-day carries a ton of



It is personal service rendered to lower animals by men

wheat thirteen miles for one cent, whereas the average cost of hauling grain to market in horse-wagons is nine cents per hundred pounds. It costs more to carry wheat 10 miles by horse and wagon than 2500 miles by steamship.

The solution of the problem of short-haul efficiency is not more teaming. It is not a matter of more horses, more hostlers, and more wagons. It is a matter of invention and engineering. It is precisely what solved the problems of manufacturing and building and rapid transit. It is the displacing of muscle by machinery.

Farming by factory methods—this is the keynote of the new agriculture. Talk about the high cost of living! If it were not for farm machinery, we could not live at all.

The horse, like the buffalo, has had his day. He is even now being displaced by the engine vehicle, just as the stage coach was displaced by the railroad, the tinder box by matches, the canoe by the steamship, the puddling furnace by the Bessemer converter, the sickle by the self-binder, the flail by the

thrashing machine, the pen by the Hoe press, and the needle by the sewing machine.

The horse is to-day an unprofitable servant.

No other invention of man has been so useful as the wheel that drives itself. Merely the wheel without the engine, was a great achievement. A wheel is vastly superior to legs from the point of view of efficiency.

A wheel, we may say, is a circular leg with a continuous foot. Nature did not give us wheels. It gave man nothing but two spokes, without a rim; and it gave the horse four spokes, without rims.

Whoever first invented wheels was a genius. He was equal to Caxton or Copernicus or Columbus. He gave us the best labor-saving device that was ever conceived in the human brain. But for thousands of years the wheel had to be pulled by legs—the legs of some man or some animal. This was a great disadvantage, and it was not overcome until the invention of the engine.

The horse, after all, is an optical illusion, so far as power is concerned. He is not as strong as he looks. Practically all of his pulling is done with one hind leg. His front legs are pilot legs mainly, like the pilot wheels of a locomotive. They serve more to hold up the weight of the body than to pull the load.

When land was worth \$20 an acre, and horses \$50 apiece, there was no urgent need for engines, either in a city or on a farm. But to-day we have an entirely different situation. Land, ordinary farm land, has gone up in price until it touches \$200 an acre. Horses—ordinary horses—without a pedigree, have gone up in price until \$1000 will buy only three or four good ones.

Land has gone up in price, and partly in quality, through the development of scientific agriculture. Horses have gone up in price, but not in quality. Engines, on the other hand, have gone up in quality and away down in price. They were never so strong and so cheap as they are to-day.



Whoever first invented wheels was a genius

This being the case, there can only be one end to the whole business. No matter what our theories may be, and no matter what our wishes may be, the horse is going out and the engine is coming in, because the engine is more fit to survive.



# NEWS of the DEALERS and GARAGES

## MOVEMENT TO FORM NATIONAL ASSOCIATION OF MOTOR CAR DEALERS

Convention to be Held at Indianapolis, on May 29th

Through the efforts of Frederick H. Elliott, one of the organizers and formerly secretary of the American Automobile Association, two conferences were held on April 22d and May 1st in New York City to formulate plans for the organization of a national association of motor car dealers, and a call is being prepared for a convention of dealers to be held at Indianapolis, Ind., on May 29th, the day preceding the great sweep-stake race on the speedway.

It was agreed by all present at both meetings that an effort should be made to organize dealers' associations in every city, and that state associations or federations should be formed with some well defined, but simple and practical plan to support and co-operate in a national organization.

It was also the sentiment of those present that provision should be made

for individual membership, where there was no local association, and all dealers are invited to be present at the convention at Indianapolis, Ind. Announcement will be made of the time and place through the trade publications and the daily press. Further information can be had by addressing, Frederick H. Elliott, chairman, U. S. Rubber Bldg., 1790 Broadway, New York.

**C. C. Gramwell**, Pittsfield, Mass., has taken the agency for the Alco truck.

**Chambers, Thomas H.**, Youngstown, O., has the agency for Velie trucks.

**McIntyre Auto Company**, Omaha, Neb., has taken the agency for the Dart trucks.

**Lewis Company**, Walton and Washington Avenues, St. Louis, Mo., will handle the Adams trucks.

**Austin Doyle's Sons Company**, Chicago, Ill., has taken the agency for the Stewart motor truck line.

**Jacksonville Electric Garage Company**, Riverside Avenue, Jacksonville, Fla., has secured the agency for the Urban truck.

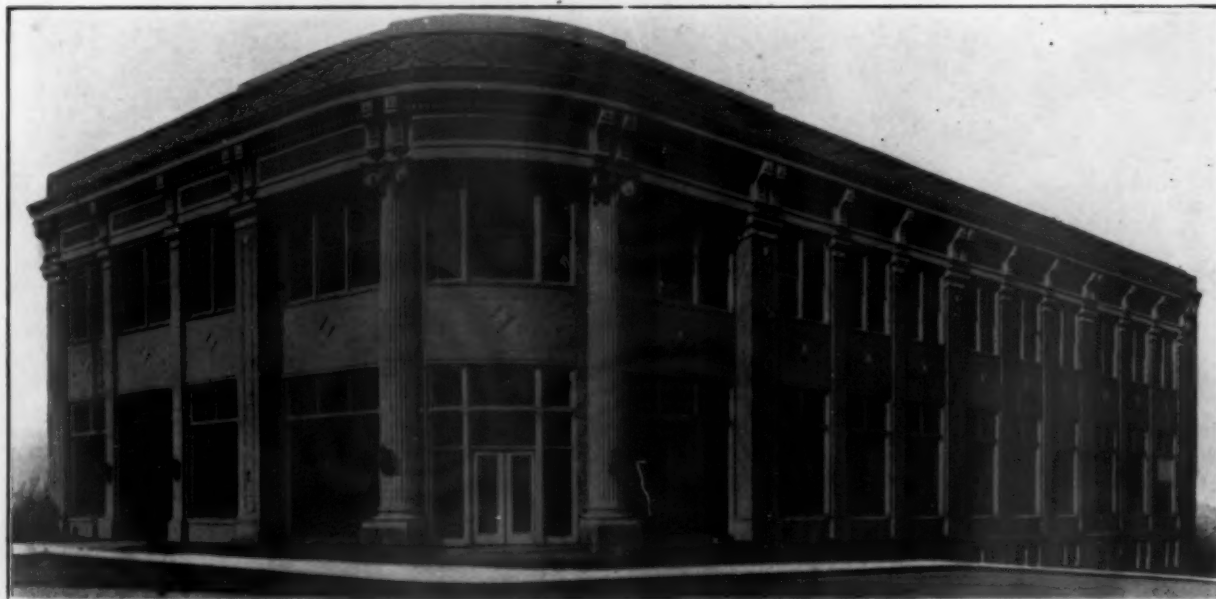
**Kelen, George F.**, Park Square, Boston, Mass., has taken the New England agency for Mercury trucks.

**International Harvester Company** has opened a retail branch for its auto wagons and commercial cars at 3944 Olive Street, St. Louis, Mo. H. H. McDonald is manager.

**Woodward Carriage Company**, San Antonio, Tex., already agent for the Hupmobile, Rambler, Overland and Wichita trucks, has taken over the territory agency for the Ohio electric and Commercial truck.

**Myer Abrams Company**, agents for the Lauth Juergens trucks, has moved back to its service station on Vassar Street, Cambridge, Mass. The work of reconstruction necessary as a result of the fire has been completed.

**M. S. Bulkley & Company**, Main & Washington Streets, Los Angeles, Cal., state agents for the Autocar, announce that they have become Pacific Coast representatives for that motor truck. The deal includes the Los Angeles and San Francisco branches of the Autocar. The firm will build garage and salesroom on site, 50 x 470 ft., on Washington Street.

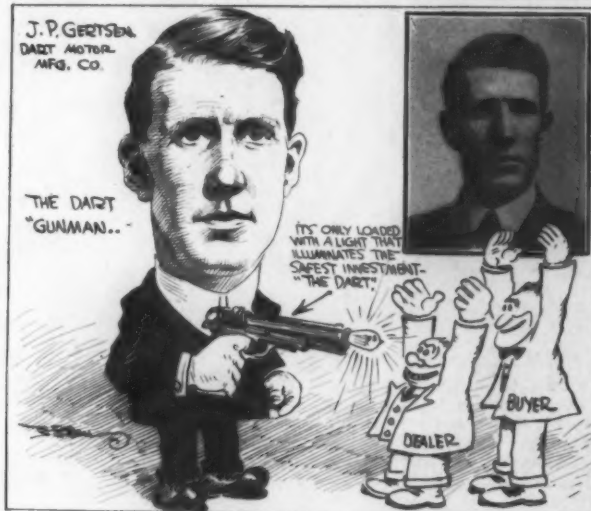
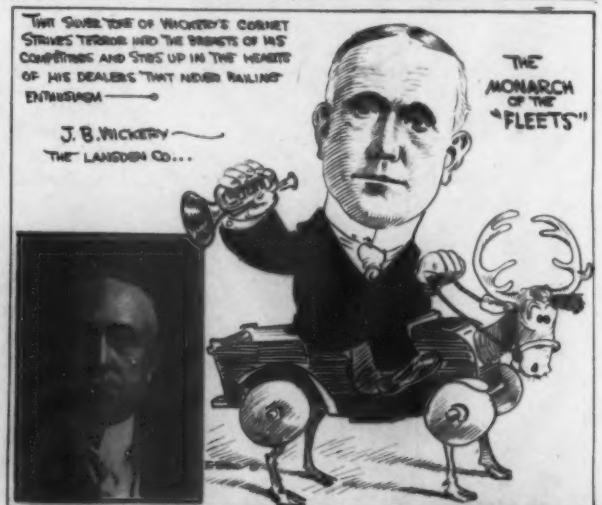
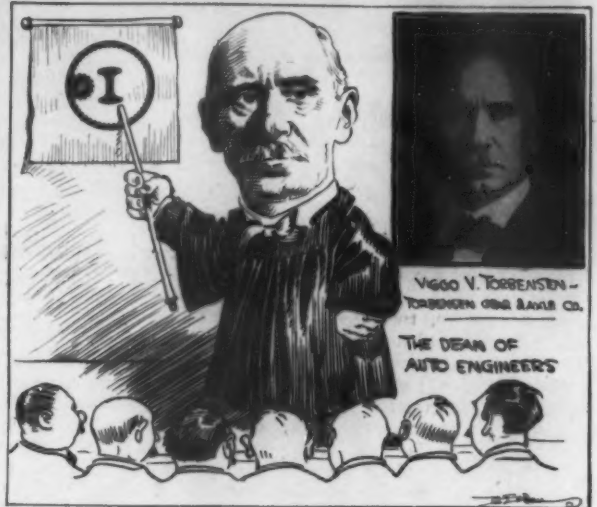
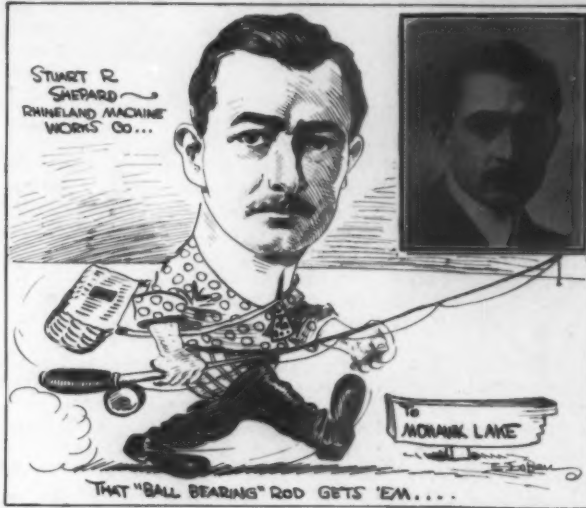


The Pittsburgh Home of the White Company

The White Company, of Pittsburgh, recently completed and occupied a most complete automobile establishment, located at the corner of Craig Street and Baum Boulevard. The building is on the side of a hill, and there are entrances at grade to both the basement and the main floor. The exterior of the building is faced with white brick and terra cotta, and the main structural work is of steel and concrete. Each floor has 15,000 sq. ft. of floor space, and the basement is used for housing heavy trucks and for storing purposes. The design includes an inclined runway and a mezzanine, so that cars may be stored in tiers. Five thousand sq. ft. of the main floor are occupied by the showroom, 8000 sq. ft. by the garage, and 2000 sq. ft. by the offices. The second floor is occupied by the repair department, machine shop, and stock room, all having the most modern equipment.



# CCJ GALLERY of SALES MANAGERS



# Commercial Cars Solving the Difficult Question of Rapid Food Transportation

**The Use of Trucks by Farmers, Commission Merchants, Milk and Dairymen is Establishing New and Better Methods of Handling the City Food-Supply Problem**

BY E. S. FOLJAMBE



HE farmer has recanted; he no longer is the enemy of the power-driven vehicle. Slowly, but surely, the commercial car is worming its way into the heart and life of the farmers of this country, and is just as surely solving the very important problem of food transportation supply to the massed population of the cities. The high cost of all food products has brought about the keenest competition among producers, commission merchants and retailers, to get the product to the consumer at the least cost, perhaps not to the consumer, but the least cost to themselves.

The commercial car has made possible the use for truck gardening of lands in many sections formerly not used because of their so-called remoteness from the market, when the only way to reach the market was by horses. Such land can be purchased at from \$25 to \$50 an acre, while land within horse delivery distance from the centers of population brings in the neighborhood of \$150 to \$175 an acre. The purchasers of such land, have, with continued foresight, installed trucks which have entirely offset the distance handicap, which was utterly insurmountable with horses.

Points even ten miles distant from a railroad station were formerly at a great disadvantage, especially for market gardening. Perishable fruits and vegetables had to be hauled to the station, where they suffered from transfer, from waits on the platform, and from trans-shipment

by train to the city, again to be handled by wagons which carried them either to the markets, or to the individual retail stores. All this consumed time and deteriorated the perishable product, which in the end after deducting freight charges, shrinkage and loss by lower prices, due to numerous handlings, netted but a meagre profit to the grower.

Profitable, but perishable fruits, such as strawberries, could not be raised, owing to their inability to get these to the market in suitable condition. Therefore, the ground could not be planted, to the best advantage, but had to be devoted to other market products of a less perishable nature. With trucks, the highest prices can be obtained for the goods, as they arrive in better condition, and in much less time than by horses or by train. The added profit which formerly went to the railroad is now pocketed by the farmer, to say nothing of



**Jersey Farmers Unloading Asparagus From Light Spring Wagon at Garage**

the fact that long, wearisome, sleepless rides on a jolting wagon have been replaced by a refreshing sweep through the air at speed, with a chance at the end to rest like a white man, in a bed. Catnaps on the load or on the bed of the wagon are largely a nightmare of the past, to which no farmer would return after having been emancipated by the truck.

William Rode, commission merchant, Dock Street, Philadelphia, is now using two Autocars, carrying asparagus and at other times fruit, produce, poultry, butter, eggs, etc., from



**Loading Trucks With Jersey Asparagus for the Philadelphia Market**  
Attention is called to the up-to-date garage

Swedesboro, N. J., and vicinity, 20 miles to Philadelphia. At the time of this writing the machines are carrying almost exclusively crated asparagus, as this is now being shipped in large quantities to the Philadelphia market. In an accompanying illustration is shown the small, but up-to-date, garage at the Swedesboro farms. The nearby farmers bring the crated asparagus to this point, where it is loaded on the trucks, and in less than 1 hour and 20 minutes arrives at its destination in the city. The drivers are men who have grown up with the business, and no trouble is experienced with their method of handling the cars or the produce. Pneumatics are used on these trucks, those on the front of one of the machines being filled, and giving good service. As high as four round trips within 15 hours have been made during rush season, the off period being between Christmas and the 1st of March. With horses it took fully 14 hours for one round trip, and then the horses could not stand it for any continued length of time. Mr. Rode said, "We always lost from 2 to 4 horses in the summer time, causing a great deal of delay. We have had very little trouble with the trucks, and this we attribute to the fact that we have such good drivers. Fully one half the trouble with trucks is due to the driver. These men inspect the trucks, oil them, screw down the grease cups at the end of each trip, and a more thorough inspection is given the machines at the end of each week." The garage has a capacity of about three cars, is hot-water heated, has cement floor, fire extinguishers, drain, etc. It is lighted by acetylene gas.

Mr. Rode was enthusiastic over the service which the machines were giving, and said that this last was the fifth truck which he had, the trucks in turn having been traded in on new ones.

Bowersox & Company, Sunbury, Pa., and G. Caruso & Company, of Logansport, Ind., are using 2000 and 3000 lb. Ideal trucks, both of these companies claiming a great saving in time, as they were formerly from 1 to 3 hours both on the outward and return trip in hauling to and from the city. The horses are now used for farm work, while the truck carries the produce.

Caruso & Company are covering a much larger territory and have greatly increased their trade by the surrounding smaller towns, which were not previously reached. They report a saving of about one half on the original cost of delivery.

Mr. Kelly, president of the Kelly-Springfield Motor Truck Company, is the proud possessor of a 12,000 acre farm at Yellow Springs, O., about 9 miles from Springfield. He makes use of one of his Kelly trucks in hauling produce, hay, grain, etc., and in the accompanying picture the truck is shown loading with baled hay for the horses.

A 3-ton Vulcan truck is used by Senator Flynn, of Pittsburgh, Pa., on his farm. This machine supplants eight horses and the accompanying equipment.

Electrics are also used, especially by commission merchants, although not so much by truck gardeners.

Mebius & Drescher Company, of Sacramento, Cal., are using a 3000 lb. Detroit Electric, as shown in the accompanying photograph, for city delivery, especially where frequent stops are necessary. The life of these trucks is figured at 10 years, and that of the batteries, which are 60 cells of Edison A-6, at 5 years. The average operating expense amounts to \$9.73 per day, which includes depreciation, interest on investment, mechanical and electrical upkeep, body repairs and painting, current for charging, garage expenses and taxes, liability, fire and property damage, insurance, battery upkeep, and driver's wages.

### Farmer Uses Motor Truck in Winter

William Kresch, a farmer living below South St. Paul, bought a Kissel 1-ton truck and placed it in service on August 1, 1912. He was highly pleased with the efficiency of the machine from the start, but worried about having his investment tied up during the winter. Finally he jacked up the rear end, blocked the front so it could not move, took off one tire, made a light wood block around the wheel, hitched a belt to it and is now grinding feed, sawing wood and cutting fodder.

He grinds one hundred sacks of feed every week. It formerly cost him 6 cents per sack to have this ground, and he had to carry it 4 miles to the mill and back again. This occupied three-quarters of a day of his time.

It now takes him 2 hours to grind his one hundred sacks at a fuel expense of 60 cents, representing 3 gal. of gasoline and 1 qt. of lubricating oil. Here is the way Mr. Kresch has figured out his saving:

100 sacks of feed at 6c per sack.....	\$6.00
Time saved, man and team ½ day.....	1.50
	<hr/> \$7.50

Against this he placed the cost of fuel, 60 cents, and a helper's time at 15 cents an hour, 30 cents, a total of 90 cents. This leaves a net saving of \$6.60. He repeats this operation every week for 31 weeks, which gives him a saving on the year of \$204.60. This not only wipes out the interest on his truck investment, but leaves him more than enough to take care of any overhauling and repairs.

Besides this he has his truck in actual road service seven months out of the year doing from twice to three times the work that a good team of horses can do.

### Ranchman Finds Truck Indispensable

The following is a record of a 3-ton truck owned by Orlando Moore, of Visalia, Cal., a fruit ranchman. He not only does his own work with his Kissel truck but also some of his neighbor's. He made one trip of 315 miles to San Francisco carrying a load of 7420 lbs. of grapes besides three passengers. The distance was covered in 31 running hours, consuming 43 gallons of gasoline and 4 gallons of oil, although the roads from Fresno to Los Banos were in horrible shape, as were the roads over the Pacheco Pass. No trouble whatever was experienced and the entire trip was made without any repairs.

In the accompanying photograph the machine is shown ready to plant grain with a 24 double disc cultivator in front of a 12 disc seeder.

He also uses the truck to advantage for pulling up trees which have to be removed.

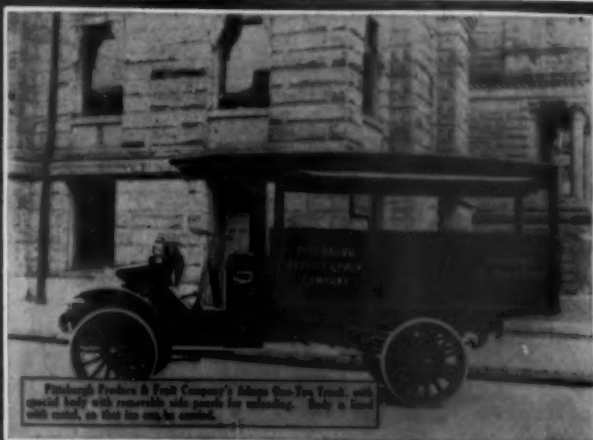
Several other trips through the San Joaquin Valley with melons and fruit were made and people all along the line wanted to know how the fruit carried, and in answer he would show them the fruit.

F. H. Cavanaugh, of Simmler, is another Californian who has found the truck a boon. Mr. Cavanaugh is 28 miles from the nearest railroad station and was formerly obliged to use 10 mules to haul a 3-ton load of fruit to the cars for shipment, the trip to the railroad and return occupying three days. His Kissel truck makes the round trip in half a day and often has made it twice in one day. He figures that doing away with his mules and the saving of time and labor brought about by the truck has netted him \$50 to \$70 a day.

### From Garden to Factory

The Silver Lane Pickle Company, Silver Lane, Conn., have their own farms at Vernon and Rockville, where their vegetable product is raised. Thus their haulage considerations





Pittsburgh Producers & Fresh Company's Adams One-Ton Truck, with special body with removable side panels for unloading. Body is lined with metal, so that its cargo is cooled.



White Truck, owned by E. Hoff & Son, Fresh and Commission Merchants, New York City, which brings live poultry to the city with less loss by shrinkage.



Hamlin Truck, operated by Orlando Hamlin, at Vinola, Cal., for farming and hauling purposes.



Kelly Truck, on the farm of the President of the Company, Mr. Kelly, at Yellow Springs, Ohio, hauling with loaded box.



Mud Truck, operated at Leguonport, Ind., by G. Corne & Company, Commission Merchants.



Autumn, with special lined screen sides, used by Albert Handell, of Washington, D. C., for hauling apples.



One-Ton White Truck, used by B. B. Anderson, fruit and vegetable dealer, Chicago, Ill. Note the size of the load carried.



2000 lb. Detroit Electric, in use by Tuberosa & Orcher Company, Sacramento, Cal., Wholesale Commission Merchants. Operating cost average \$2.72 per day, including everything.



Transferring the Fruit From Trees to Truck to City

start with the transportation of vegetables from farm to factory. The extent of this work may be partially realized when it is known that 10,000,000 pickles are made from these farms.

Last April the company purchased a three-ton Kissel Kar truck which was intended to cover the farm to factory route, not much additional duty being expected of it. They soon learned, however, that the truck could handle the trade in nearby cities, deliver direct to customers, save time and expense and greatly increase the satisfaction of patrons. Now this truck takes care of the company's business in Northampton, Mass., 50 miles distant, Hartford, Conn., 14 miles, and Bridgeport, 108 miles, and its ground covering ability is not yet exhausted. It is now proposed to send the truck in regular trips to Worcester, Mass., 90 miles away.

### Truck Takes Place of Railroad

F. C. Gould, of the Silver Lane Company, tells of a record which shows the manner in which this truck improved upon certain railroad facilities which is supplanted. A shipment of sauer kraut from Rockville to Hartford, only 14 miles, was so delayed in transit that its arrival took place eight days from the date of shipment. The truck from that time on performed this service with regularity and certainty inside of two hours.

During the harvest period, according to Mr. Gould, it actually earned more than \$50 a day in excess of its operating cost. The approximate cost of operation, based upon figures estimating a year of similar average cost on a basis of 300 working days, is \$12.50 a day. This included 5 per cent. interest on the investment, 20 per cent. depreciation, wages, fuel, repairs, tires and taxes.

When good roads become general, it will not be necessary to tell the farmer how the motor truck can save him money. It can save for him to-day, with all the disgraceful stretches of highway still remaining. With good roads, it will not only enable him to better master his own haulage problems, but will confer added convenience by bringing supplies directly to his door. For, as fast as good roads multiply, just so fast will the truck supplant the steam railway as well as the horse for medium distances.

A lucrative business has sprung into existence with the advent of the farmer's use of trucks, namely, that of collecting produce, foodstuffs, ice, etc., and hauling same to the city markets for those not fortunate enough to possess a modern vehicle. Horses cannot compete; for example, the farmers in New Jersey within a radius of 26 to 28 miles from Camden are large converts to the use of the truck. These men, as stated

by one farmer, formerly loaded up at 3 o'clock in the afternoon, started about an hour later on an 8-hour drive to Camden. A stop had to be made en route to care for the horses, arriving in Camden at midnight. After crossing the river, unloading at the commission houses of Philadelphia, and returning to Camden, it would be in the neighborhood of 2 o'clock, with the horses tired as well as the driver. After feeding the horses the men would snatch a little sleep in the wagon, and then start again on another 8-hour drive in order to arrive at noon the next day. Now, the motor trucks start in the afternoon, and arrive at the Philadelphia market in two hours and a half, with not an egg cracked in the baskets, to say nothing of those crated. In rush season several round trips are made in the 24 hours, using a shift of men, with great saving to the freight and to the pocketbook.

Small merchants in the suburban sections at cross roads off from the railroads are using trucks for bringing eggs, butter and other produce to the city. These men also report a saving in time, as these 15 to 25-mile trips are now made very much quicker and are not the tiresome ordeal that they were formerly. When not used for city trips the trucks are employed in picking up eggs, butter, and hauling groceries in the surrounding territory.

The Matteson Auto Transfer Company, of Woodstown, N. J., conducted by I. K. Matteson, with a Wilcox truck, maintains a daily service between Woodstown and Philadelphia, a distance of about 26 miles from Camden, making the round trip, including the necessary collecting of goods in Philadelphia, of about 60 to 70 miles. At times two round trips a day are made, totaling 110 to 115 miles. Mr. Matteson does general hauling for farmers and stores to Philadelphia, and returns with meat, groceries, ice, empty egg and asparagus crates, and milk cans. On May 6th, which was a typical day, the truck started at 8 A. M., picked up a crate of eggs, three Prest-O-Lite tanks from a garage at Woodstown, one mile out, six cans of milk and two crates of asparagus were taken on; a little further 10 crates of asparagus, then 18 cans of milk and some more "grass," all within four miles of the starting point. A little further on 10 more cans of milk were taken aboard, and 8 crates of eggs. The truck arrived at Camden about noon, and after crossing to the city and delivering, reached the office, at 421 Market Street, at about 1.30, where a stop was made for lunch. In the afternoon various places were visited, and orders taken in Philadelphia to carry groceries and other freight to small stores near Woodstown and on the road out. Empty milk cans, empty asparagus crates, etc., were taken aboard, and the truck left Philadelphia at 4, arriving at Woodstown about 8 in the evening.

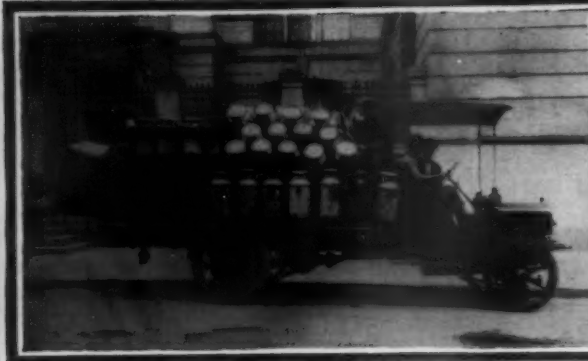
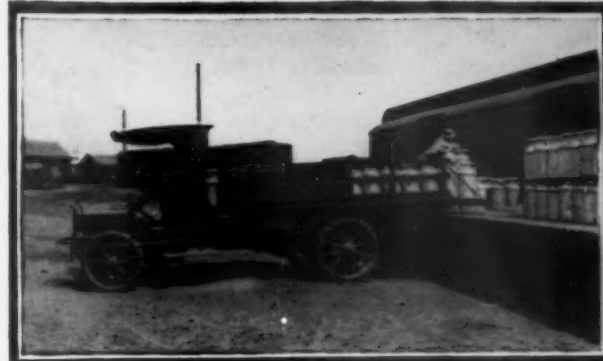
The truck uses about a gallon of lubricating oil a day, and from 10 to 13 gallons of gasoline, according to the number of stops, loads, road conditions, etc. It has now been in use for over a year, and has been driven by Mr. Matteson himself, with a boy helper. When asked whether the truck paid, he said, "Well, I don't keep any records, but if four drunks hadn't run into me and smashed me up and put me out of business for several weeks, so that I lost many customers, I would have had another machine in service by this time. I expect to put on another one now in a few days."

L. M. Howard, of Farmington, Mich., uses a Federal, which averages, during the market gardening season, over 50 miles a day. Twice a week it makes a trip to the Detroit market, a distance of about 21 miles. The roads are very poor, and before the installation of the truck this firm was unable, with horses, successfully to supply the Detroit markets.

Page & Sons, Portland, Ore., have been operating a Federal truck for over two years. This machine has displaced two teams and wagons, and is used in making trips out of Portland to the various ranches to pick up produce. It is claimed that it has not missed a single business day in the two years. A novel use of the truck is that of taking fruit directly from the trees. In many instances this company has purchased the apple and cherry crops as they stood upon the trees. A camp outfit was loaded upon the truck, and the harvesting party proceeded up the mountains to the ranches, where they camped until the crop was picked and ready for shipment. The truck then transported the fruit overland, sometimes a couple of hundred miles, to the various shipping

### Interesting Cost of Operation Records

Actual cost figures are very difficult to obtain, largely because so few users keep such records. The following most complete record of a 3-ton Avery truck, owned and operated by J. F. Wheeler, Millard, Neb., is, therefore, of interest. This truck is used for hauling milk, cream and various kinds of freight from Millard to Omaha and return, the round trip being 40 miles. Mr. Wheeler states he has made this trip every day for three years, including Sundays. The truck has now run over 65,000 miles, and owing to this record, another truck of the same make has been put in service, the latter now making one round trip per day, hauling three tons each way. Attention is called to the fact that these trucks are practically never empty, which is the way to make the power unit pay.



Group of White Trucks Used by Dairymen, Showing Loading and Unloading at Railroad and Carrying the Empties and export points along the coast. In the accompanying illustration the truck is shown on such an expedition.

### Dairymen Using Trucks

The speed and distance ability of the motor truck has brought it into extensive use in hauling milk direct to the city, and also by creameries, who gather the milk and cream from the farms in a large territory, carry it to their central stations, where it is made into butter, and from these points the trucks carry the finished product to the city creamery headquarters, and also deliver from this point to the individual retail stores. It has been found by progressive men in this business that instead of locating directly on a railroad, where they will be at the mercy of that road, the trucks have made it possible to locate creameries at points between railroads in such a way that they can haul rapidly to either railroad, and thus the railroads have to compete for the business. In this way, better rates, free iced cars, etc., are accorded large shippers, all of which would be impossible if using horses.

#### Initial Investment of Truck

One Three Ton Truck—\$3200.00.

#### Daily Expense of Truck

Depreciation 20 per cent. on original investment per year..	\$2.1333
Interest at 6 per cent. per year.....	.6400
Insurance 24 per cent. per year.....	.2500
Garage 80c per day.....	.8000
Gasoline, 6 gal. at 16 $\frac{3}{4}$ c per gal.....	1.005
Oil, 2 qts. at 55c per gal.....	.2750
Grease, 2 lbs. at 10c per lb.....	.2000
Wages of driver, (does not use a helper) per day.....	2.5000
Tire expense, figured at .0370 per mile, 40 miles.....	1.4800

Total expense of operating truck, per day.....	\$9.2893
Cost per mile .....	\$0.2322
Cost per ton mile .....	\$0.0774

Daily expense of horses and men needed to do the same amount of work as truck. Mr. Wheeler says six horses and three men would be a low estimate.

#### Initial Investment of Horse Equipment

Six horses at \$175.00 each.....	\$1050.00
Harness, \$50.00 per team.....	150.00
Three dray wagons, \$175.00 each.....	525.00

Total initial investment.....\$1725.00



### Daily Expense of Horse Equipment

Depreciation, 20 per cent. on original investment per year	\$1.1500
Interest at 6 per cent. on investment per year	.3450
Insurance at 2.4 per cent. per year	.1380
Barn rent, 50c per day per team	1.5000
Feed, 75c per day per horse	4.5000
Veterinary and medicine, \$12 per year per horse	.2400
Shoeing \$25.00 per year per horse	.5000
Wages of 3 drivers at \$2.00 per day	6.0000

Total expense of operating horses and men per day	\$14.373
Cost per mile	\$0.4030
Cost per ton mile	\$0.1176
Saving per day of truck over horses	\$5.0837
Saving per year, as Mr. Wheeler uses his truck every day in the year, is $365 \times 5.0837$	\$1855.55

The Yuba City Creamery Company, of Yuba City, Cal., with a 1500 lb. truck, is covering 100 miles a day, stopping at 50 farms, gathering dairy products for market. It formerly took three teams to do this work, and cost \$20 a day more than the new way.

The Penn Creamery Company, of 39 S. Water Street, Philadelphia, are using two 1½-ton Packards, one two-ton, and one three-ton Packard. The three-ton is the oldest, and was purchased in 1911. These are used in gathering milk and cream within a radius of 25 miles. They average about 45 miles a day.

The Edson Brothers Company, Dock Street, Philadelphia, are using two Autocars and one Packard in their city delivery, and three Packards at Sayre, Pa., which is the headquarters for 27 creameries operated by this company. In the city service the trucks average about 43 miles a day, using about five gallons of gasoline. They deliver butter, poultry and eggs to the retail stores. Formerly, with horses, business in the outlying districts was not encouraged, and only when a large number of customers could be obtained in one place was it found expedient to attempt to care for this trade. Now, with the trucks, they do a large business in the suburbs.

### A Novel Sample Car

The Edson Brothers Company are now fitting a Cadillac with a truck body of special design, with ice chests, to be used as a demonstrator or order getter, by a special salesman, who drives out to the small stores, and there shows exactly what he is handling. After customers are obtained in this way the trucks make regular deliveries.

This firm was noted for the fine horses and equipment, and the same idea has been carried out in the use of trucks. The drivers are old in the employ of the company, and are paid more than when driving the teams, get home earlier and



Sampson and Alco Trucks Waiting to be Loaded  
These trucks have worked night and day since their installation.

are better satisfied. One of these men is really in charge of all the vehicles, and this fact, together with the one day a month regular inspection of the Autocar and Packard service stations, keeps the vehicles in first-class condition.

### Commercial Cars Save Money and Give Satisfactory Service to H. P. Hood & Son, Boston, Milk Dealers

H. P. Hood & Son, the well-known dairy company, of Boston, Mass., very early became interested in commercial cars, believing them to be the solution of the difficult problem of rapidly carrying the milk from their main stations to the branches, sub-stations, and chain of stores in and around Boston. At the present time twelve trucks are used in this service—five Alcos, one Sampson, three Autocars and three Chase. A new 6½-ton Alco has just been ordered, and the Company intends to increase its commercial car equipment until it is ample for all of this kind of delivery.

### Trucks on Schedule Operate Day and Night

One of the Alcos began in January, 1911, and has been worked by two, and even three shifts of men ever since, having covered some 50,000 miles since it started. This truck is shown in an accompanying illustration, as it appeared in one of the small garages of the company, where it was being overhauled. It is Truck No. 2, of the fleet, all the trucks being numbered and operating practically on scheduled time. Some of these cars, Nos. 3, 11 and 12, are operated both day and night, using two shifts of men.

Another of the machines put in service July 6th, 1911, has averaged 70 miles per day, carrying five tons per load ever since that date. This particular truck makes three daily trips from Charlestown, across the city of Boston to the Forest Hills branch, carrying canned milk, and then three trips are made to Chelsea with bottled milk, the truck, of course, operating at night as well as in the daytime. Another car started January 28th, 1913, and in six weeks time has covered 3,086 miles, without a cent of repairs, and without it being necessary to do anything whatever to it, not even to grind in the valves.

Autocar No. 4 started December 21st, 1912, and has been on the road continuously ever since, having covered 3,600 miles. There has been no expense except that two tires were changed in March.

The question was asked what would be done in case one of the big trucks should be unexpectedly laid up, and E. S. Farnsworth, in charge, replied that they would simply work some of the other machines overtime and take care of the larger truck's duties.

At the present time it is not deemed necessary to keep any special equipment in reserve, as the trucks each night are inspected, and the driver hands in a report, and is expected to call the attention of the garage superintendent to any unusual occurrences, or any parts which he has reason to believe need attention. This, of course, is in addition to the inspection given the truck at the garage. All repairs are made at the various stations where the cars are kept. The drivers do no repair work. Up to this time, small corrugated iron garages have answered the purpose, but plans are now being drawn for a large garage, to be located in Charlestown.

### The Daily Report

Each driver fills out the blank form, which is herewith reproduced, the number of the car he is driving, his name, the

(Continued on page 52)

# Motor Fuel

BY HARRY TIPPER

**NOTE**—The following extracts are from a paper presented before the Indiana section of the S. A. E., by Mr. H. Tipper. The information given comes direct from a man connected with the oil industry and the facts stated concerning the market prove conclusively our contention that kerosene as an internal combustion engine fuel must come into general use in the near future. The conditions stated in this paper are ample evidence that our series of letters to car and carburetor manufacturers, some months ago, urging them to provide for the use of kerosene, was wholly justified.—Editor.



**PROFESSOR MAGRUDER**, of the Ohio State University, stated the other day that if all the gasoline engines in the country, now in use, were allowed to run at their rated horsepower for ten hours a day, the gasoline supply would only last about thirty days. In other words, the gasoline engines in use could be run at their horsepower only for one hour a day for 330 days in a year.

There is no such thing in the refiners' mind as gasoline. That has been merely a commercial term applied to a distillate, or a fraction of the crude, which has varied from time to time, according to commercial requirements.

## Gravity Means Little

The gravity of any fraction of petroleum has little to do with its value, either from the standpoint of fuel or from its ease of vaporization. It is a convenient check used by the refiner to determine the uniformity of the fraction which he is cutting off.

Consequently, in considering the motor fuel question, gravity is of no value to the automobile manufacturer, the carburetor manufacturer, or the man using the machine in judging the fuel he is getting. This is true, first, because the gravity of the commercial fuels varies according to the State in which they are produced and the State in which they are sold; second, because the gravity may have no connection with the distillation test, and, third, because one gravity cannot be stated for all the fuels in connection with which you are experimenting.

## Kerosene Market

In order that the refiner may work on the most economical basis it is advisable that his market should be equally good for the different fractions, or by-products, that he gets off. If his market for one set of products is in excess of the percentage of that fraction, and his market for another set of products is below the percentage of that fraction, the first fraction must carry some of the cost of the second fraction, because the oil cannot be distilled without separating those fractions in some way or another, and the fraction for which there is a lesser market must be stored or kept in some way; and the storing of oil costs a great deal of money.

## Cracking Distillation

Furthermore, the use of special means of increasing the lighter products by cracking distillation of the heavier products merely throws the balance out. Anything that gives you a larger supply of motor fuel by reducing the percentage of the very valuable lubricating, and other by-products, is only a temporary expedient.

## Gasoline Fraction Length

On account of the increase in the use of the requirements of gasoline it has been necessary to lengthen the fraction until it includes what was originally termed gasoline, the naphthas and, in some cases, part of the kerosene fraction. Otherwise the demand could not be supplied.

## Blended Fuel

Questions have been asked about blended fuel, casing head gasoline, etc., and it is necessary to state that a broken distillation curve arises usually from the blending of a high and low gravity oil. In the carburetor the high gravity oils will all evaporate before any vaporization of the low gravity portion takes place. This is apt to cause spitting and missing due to much less vaporization and a much greater amount of low gravity fuel passing over as liquid globules.

## Insatiable Demand for Gasoline

While interesting, all these conditions are, however, merely indications of the fact that the refiner finds it difficult, if not impossible, to meet the demand of the motor industry to-day without resorting to all possible means to increase his supply. With all his ingenuity the total output will not take care of the situation. In October of last year some preliminary estimates of the number of cars to be built this year were probably very much overstated. One estimate was 600,000 cars. It would take 45,000,000 barrels

of new crude to supply the increased demand of 600,000 cars using 1 gallon of gasoline per day each. It would take something like \$75,000,000 of new facilities to bring that increase to market as gasoline. That is new business entirely, and we can hardly supply facilities for the present demand for the fuel.

Under those conditions it is hard for the refiner to see any other possibility than the final cutting down to the kerosene fraction. Gasoline and naphtha represent in many crudes less than 10 to 15 per cent. of the total; in some not more than 5, and in a large percentage of the new oil which we are getting from California and Mexico the percentage is so small that it is impossible to refine it commercially. The kerosene fraction represents from 25 to 40 per cent. of the total. Here is where the future possibilities lie. It is possible for us to increase this fraction by taking in what we can of the lighter product. But even so, the amount will have to bring us down gradually into the kerosene fraction, until we will be taking practically the kerosene fraction without considering the higher test kerosene, like the miners' oil, and so forth. If the business keeps on increasing as at present it is inevitable, unless we make discoveries of fields, upon which at present we have no information or discover processes upon which at present we have no determinations, that we shall cut down in the fraction and take two lighter and possibly all fractions of the kerosene. For illuminating purposes 150 fire-test kerosene is better than 110, as recognized by its higher market value. But for fuel purposes the 110 is very much better than the 150. The 110 and 130 kerosene are what you would get, in the first place, in considering kerosene as a fuel. As a temporary expedient, we can and are at the present time giving you a fuel which contains little or nothing of the kerosene and takes in the naphthas; but if the present rate of increase in the use of gasoline is to continue, we, ourselves, have no means of determining how long this will continue. It must be remembered that last year the refinery oils from which we get the gasoline produced in the United States decreased by about 5,000,000 or 6,000,000 barrels. We took about 15,000,000 barrels out of storage in order to make up the deficiency, and this year the prospect of any new production is very small. We have no means of determining, in many of the fields, how much future production we can get. The general tendency of the new production is to the heavier base oils, which contain less of the light products. Consequently, all we can say is that under the present conditions it will be necessary to cut deeper into the heavier part of the distillate in order to supply the demand. It will, therefore, be necessary to modify the carburetor to meet the physical condition which it is absolutely impossible to evade or convert.

## Discussion

**W. G. WALL**.—Mr. Tipper did not tell us just what percentage of the crude most of the companies set aside for lubricating oil and I would like him to tell us what the heavier distillates are used for besides lubricating purposes.

**HARRY TIPPER**.—Some of the very heaviest crude oils, such as we have been shipping lately from Mexico, are almost solid when we get them out of the ground. There is practically no light oil, practically no lubricating oil in them. They are almost pure asphalt. The percentages averaged for the number of crudes we are using regularly, which may not obtain exactly in any single instance, range from about 40 to 50 per cent. for the lightest to the heaviest lubricating oils, the waxes, the greases, the asphalt and products of that kind. While one industry is affected by the gasoline question, absolutely every industry is affected by our ability to supply lubricants. Anything we take away from the lubricating end to supply the fuel demand is opposed directly to the progress of the industries in which the civilized world is now engaged. The increase in the use of motors last year increased the use of lubricants for the household almost 100 per cent.

**HOWARD MARION**.—Are automobiles the cause entirely of the increase of gasoline consumption? What about motor boats and farm engines? I would like to ask, also, whether there is a stored accumulation of kerosene at the present time?

**HARRY TIPPER**.—The heavy-duty slow-moving engines and some of the larger motor boats are being run on kerosene. There are more gasoline stationary and motor boat engines than there



are gasoline engines in automobiles; the automobile industry represents not quite half the total number.

We carry a considerable number of million barrels of kerosene in stock. The small refiner who is limited in the amount of money he can put into storage generally requires the jobber who buys gasoline to buy kerosene at the same time. The kerosene market is not very healthy. We have kept it up by going into China, Africa, Persia and India, getting the natives to use kerosene instead of torches and old methods of lighting. That is the way in which some of the surplus has been disposed of largely. But there is an oversupply of kerosene in the market. The market is continually falling in some countries.

G. A. WEIDELY.—What do you, from the oil man's standpoint, consider it is necessary to do in order to adapt the motor car motor to the use of the heavier fuels, like the lower-grade gasoline and the higher-grade kerosene?

HARRY TIPPER.—While we are endeavoring to carry the same grade of gasoline as we did last year, we are not sure we will be able to keep that grade up all year. We have had to cut down on other people who require some of these lighter products in order to supply the motor people. If the other people are going to require us to supply their demand by meeting the price, we are going to have to go into the heavier fuels. The probability is that we will include in the immediate future some kerosene in the fraction which we would call motor fuel; a longer distillation but not a break in the curve. If the increased demand continues at the present rate, we are going to be up against something which only the large fraction we have in kerosene will begin to take care of.

It is a question whether the gasoline motor needs redesigning. I think it is a matter of the prevention of condensation. It has been my experience that I could run on kerosene in the summer time when the motor was well heated, because then the manifold kept the kerosene from recondensing. In ordinary cool weather the manifold did not become sufficiently heated and the kerosene began to form in little globules, giving carbonization, smoke and a lot of trouble. It may be necessary to heat the fuel in the carburetor, but, from a refiner's standpoint, it is preferable to heat the air, because heated air will pick up the kerosene and vaporize it at the same time. If you should heat the kerosene itself, you might heat it a little too much and begin to get preignition on account of getting close to the flash point. I believe that no radical change in the engine itself is necessary, but a change in the accessory parts.

Lubrication has a great deal to do with fuel economy.

### SOME INTERESTING FACTS FROM BALDWIN'S

The following are some facts and figures of interest in connection with the fleet of Saurer trucks being operated by the Baldwin Locomotive Company between their Philadelphia and Eddystone plants, 13 miles apart.

Four five-ton Saurers were purchased, and were operated under the closest scrutiny. To-day the Baldwin Locomotive

Company own ten five-ton Saurers, making repeat orders of six trucks.

With the exception of an occasional trip to the railroad yards, the entire fleet operates between Philadelphia and Eddystone. Each truck makes two round trips every 12 hours, night and day—52 miles each 12 hours plus several miles of travel around the plants, getting and discharging loads, making an average of 60 miles rather than 52. The trucks are loaded, going and coming, generally, to capacity, 10,000 lbs., 20,000 lbs. each round trip; 40,000 lbs. carried each 12-hour day; 80,000 lbs. every 24 hours, year in and year out. This amounts to a perpetual endurance test between the ten trucks. As stated above, the proof of the truck is in the using.

The Baldwin Company makes many freight shipments from Philadelphia to Eddystone, and vice versa, but everything they want delivered promptly goes by truck, a truck taking only one and a half hours to make the trip one way. In reality, their fleet of trucks constitutes a private express line, composed of ten separate and distinct transportation units, each of which is operated independent of the others, and can be put into operation at a moment's notice. Plans may be changed at will and the trucks meet the contingency quickly, cheaply, efficiently.

It costs the Baldwin Company, according to their own figures, \$12 per 12-hour day per truck to operate.

Figuring 60 miles per day of 12 hours for each truck, gives a cost of four cents per ton mile.

The adaptability of motor trucks and their power to help out in an emergency is surprising, and in many cases spectacular. Not long ago it was necessary to send a small commercial locomotive from Philadelphia to Eddystone. While it was much smaller than the ordinary service type, it was of a very considerable bulk and weighed much more than five-ton trucks are supposed to carry. Nevertheless the entire locomotive was swung bodily, by means of a crane, upon one of the regular fleet and shipped off to Eddystone just like any other piece of freight.

It is a common sight to see one of the Baldwin cars serve as a switch engine around the Eddystone plant. If they want one, two or three freight cars moved, empty or loaded, and no switch engine is available at the moment, there is no wait, but a truck is hooked on and the cars moved without difficulty.



Ten Saurer Five-Ton Commercial Cars Owned by the Baldwin Locomotive Works, of Philadelphia  
These trucks make regular trips between the Philadelphia works and the Eddystone works, a thirteen-mile trip



## The Burning Question

HUGH DOLNAR



HOW can the fuel cost of motor car service be reduced? Gasoline cost is already so great as to be a serious economy factor. It is safe to say that every single motorist existent keenly desires to reduce his motor fuel bills.

How is this cost to be made smaller?

Crude petroleum, as it comes from the oil well in various quarters of the earth's surface, varies greatly in heat giving elements, some varieties containing more heat units than others, but kerosene and gasoline, pound for pound, are of nearly equal value as heat producers, and the best crude petroleum for internal combustion motors is not so very much inferior to kerosene or gasoline. The crude petroleum can be had at from 3 cents a gallon to 5 or 6 cents. Kerosene is worth 5 cents to 6 cents in carload lots, and gasoline somewhere around 20 cents per gallon, in the United States, to 75 cents per gallon in London.

Obviously, the motorist can save in fuel costs by using either kerosene or crude petroleum.

The best source of information as to the mechanical requirements of successful use of crude petroleum and kerosene is the largest and most successful manufacturer of oil burning engines in the world, which distinction belongs, beyond question, to the Rumely Traction Engine Building Company, of Laporte, Ind., U. S. A., working the motor inventions of John A. Secor, and Mr. Secor's nephew, William H. Higgins.

This company will this year distribute about 3,000 Farm Tractors, developing about 132,000 b. h. p. from Secor oil motors.

The Rumely Company took up the Secor motor five years since, this company's steam tractor sales for that year, 1908, being about 150, as against 3,000 of the kerosene-burning motor tractors which will find purchasers this year.

Fortunately for readers of this publication, the Rumely management, Mr. Secor and Mr. Higgins, are all three alike in being big and wide enough to give the fullest possible information, as is shown by what follows.

John A. Secor was born in New York City in 1847. About 1893 he turned his mind to the consideration of power production by burning liquid fuels, and his hands to the construction of internal combustion motors, to such good purpose that the Secor Kerosene Engine, under perfect governor control, showing not more than one-half of one per cent. speed variation, full load all on or all off as quickly as an electric resistance switch could be handled, was completed and on exhibition in New York City in 1900,—too early for the world's appreciation.

Business considerations led him, in 1908, to consider most flattering proposals from the Italian Naval Department to apply his oil engines to Italian torpedo boat propulsion. Immediately, however, he received a wholly unexpected proposal from the M. Rumely Company, of Laporte, Ind., to undertake the application of his new motor to the Rumely Farm Tractor, which he accepted.

### The Oil Tractors

Secor favors the fewest number of cylinders possible, and decided on single cylinder motor for low power and double cylinder motor for high powered tractors.

An approximation to the horizontal cylinder type of motor was used, giving sure drainage of cylinder to crank-box. The cylinders were inclined at a 10 degree angle to horizontal, crank-box ends low.

The mechanically operated intake valves are placed on top of the cylindrical compression space and the exhaust valves on the bottom of same, both these being 45 degree angle poppet valves.

The "Tangye" form of motor frame was adopted with integral cam shaft bearings all enclosed in a crank-box with

a readily removed cover, affording access. The individual cylinders, having applied cylinder heads, are bolted to the crank-box end, thus obtaining a very readily assembled and disassembled construction of the fewest individual units, all important moving parts enclosed.

Ignition is by a leather-cased Bosch low-tension magneto, with starting battery and make and break spark plugs.

The Higgins carburetor was already at hand, supplying the motor with gasoline, kerosene, and water under governor control. Secor placed the

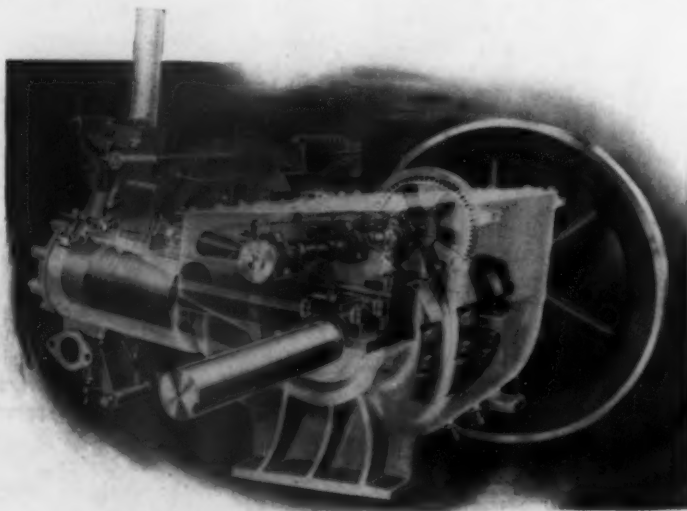


Fig. 1. Secor Kerosene Motor Construction

first Rumely "Oil Pull" Farm Tractor, twin cylinders, 45 b. h. p., on the road in March, 1909. This Oil Pull Tractor has been continued to the present day with only very minor improvements.

### Particulars of Secor Motor

Cylinders (small engine), bore, 9½ in.; stroke, 12 in.  
 Intake valve port diameter, 3¾ in.  
 Exhaust valve port diameter, 3¾ in.  
 Con. Rod, C to C, 2½ in.; stroke, 30 in.  
 Cam shaft diameter, 1 13-16 in.  
 Crank shaft, wrist and journal diameters: Wrist, 4½ in.; journals, 4 7-16 in.  
 Cylinders, large, bore, 10 in.; piston stroke, 12 in.  
 Intake valve port diameter, 3¾ in.  
 Exhaust valve port diameter, 3¾ in.  
 Crank wrist diameter, 4½ in.  
 Journals, 4 7-16 in.  
 All crank shaft wrists are 4½ in. long.

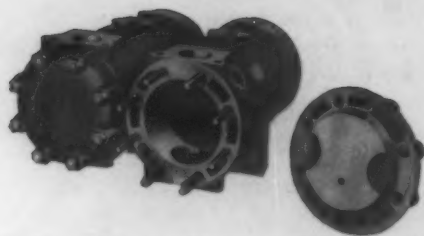


Fig. 2. Secor Kerosene Motor—Cylinder Construction

The piston pins are all  $2\frac{3}{4}$  in. diameter, are all solid, case hardened and ground, are fixed in the pistons and turn in the rod ends length of rod and pin bearing  $5\frac{1}{2}$  in. in all rods.

The ratio of compression space cubic content to piston displacement cubic content is 30 per cent.

The maximum power for each small cylinder is 30; for large 35 b. h. p. or say 70 b. h. p. for large twin cylinder motors.

Crank shaft constant speed 375 r. p. m.

### The Secor Crank Shafts

Some of the crank shafts are drop forged to rough crank shapes, while some are shaped by cutting from the solid.

All crank shafts are "heat treated" or annealed. The preference is for great tenacity and twisting before breaking; test specimens must show 75,000 to 85,000 lbs. tensile strength per sq. in., and 20 per cent. elongation in 8 in. test piece length before breaking. The factor of safety is about 10.

### Secor Motor Cooling

The cylinder jackets and radiator are filled, not with water, usual practice, but with cooling oils, known as "Zero Black," "Polar" and "Arctic Ice Machine," used instead of water to obviate freezing dangers.

### Driving Wheels

The driving wheels of the Oil-Pull Farm Tractors are either 64, 70 or 80 in. diameter, and the gear reduction ratios give respectively, 1 9-10 m. p. h. for large tractor, forward and backward the same; and for the smaller tractors  $2\frac{1}{2}$  miles forward and back, with 4 miles high speed forward.

### The Higgins Carburetor

All of Secor's practice to date is constant crank shaft r. p. m. with butterfly governor control, and the entire Rumely Tractor practice has been with the Higgins carburetor, which consists of three over-head chambers (Fig. 5), two supplied by mechanically operated plunger pumps to varying fluid levels fixed by overflow pipe heights, one of these automatic pump supplied chambers containing water and the other containing kerosene, and the fluid level being lower in the water chamber and higher in the kerosene chamber. The third over-head chamber is hand pump supplied with a sufficient quantity for one starting, about one-half pint, of gasoline, the fluid level being higher than the kerosene level. See right hand side of Fig. 10.

The gasoline chamber being sufficiently filled, piston suction on gasoline delivery duct S, draws the gasoline up past the gasoline needle valve for starting charge adjustment, and delivers this suction drawn gasoline to the mixing chamber and motor intake. This starting needle valve adjustment is made by the tester at the factory and never changed thereafter. All the gasoline hand pumped into the gasoline chamber is used in one starting, and must be renewed when the motor is again to be started.

When the motor is stopped in the field the kerosene and water needle valves, Fig. 10, are hand closed, and remain closed until the motor has started and runs about to speed on gasoline, when the kerosene needle valve is opened to the factory tester's mark on the head, and spring friction retained; the fixed index is not shown in the cut.

Because of some gasoline fuel supply the first few working strokes made after opening the kerosene needle valve to place, will have too much fuel and give a smoky exhaust until the gasoline is used up. Then the motor runs sweetly at fixed speed.

The water needle valve is opened to the adjuster's mark as soon as the motor begins to warm up, which leaves the motor free to take

water when the motor load automatically increases the piston suction in the mixing chamber sufficiently to lift the water up to the two small delivery holes, H<sub>2</sub>, Fig. 10, and deliver the water overflow to the carburetor mixing chamber. The water intake is thus made dependent on the motor load, so that the motor takes water when it needs water, and at no other time.

The water is forced by the pump through a water delivery pipe coil about the exhaust pipe, so that it is always delivered warm to the carburetor

water chamber, simply to prevent water freezing in cold weather.

Water admission begins at about half power and increases to full power, the maximum volume of water admission being about the same as the maximum volume of liquid fuel admission.

### Effect of Using Water

The effect of the water admission to the cylinder is to reduce cylinder heat, delay combustion and reduce the maximum cylinder pressure, while increasing mean effective pressure, or in other words, "fattening" the indicator diagram. Water admission to the cylinder makes for both fuel economy

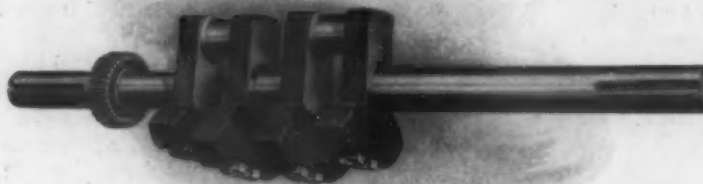


Fig. 3. Crank Shaft of Secor Two-Cylinder Motor  
Gray iron counterbalance weights are bolted on, as shown



Fig. 4. Piston and Connection Rod Assembly of Secor Motor



Fig. 5. Higgins Gasoline, Kerosene and Water-Supplying Carburetor  
Complete assembly ready to go on cylinders of two-cylinder Secor motor



Fig. 6. Ideal View of Higgins Carburetor as Applied to Secor Motor

and motor durability, and is as desirable in the automobile motor as in the farm tractor engine.

For air port adjustments, see Fig. 9, diagrammatic horizontal section of the mixing chamber below the fuel and water chambers. The carburetor takes air through the middle and right port, marked "Air inlet," and delivers mixture downward through the left port, marked "Mixture to Engine."

The effective areas of these three ports are affected by two sliding valves,—one at the right marked "Adjusting plate," which is hand adjusted to a fixed position by the factory tester and retained by screw pinching. The top surface of this hand adjusted slide is flush with the governor actuated flat sliding valve seat, so that this governor actuated valve, marked "GV," can also vary the effective area of the two air intake ports, and of the mixture exit port to the cylinder.

The valve "GV," is shown in Fig. 9 at about half power position, and is moved by the governor to the right when the motor speed is too low, closing the right air port, and opening the middle air intake port and the left, mixture-delivery-to-motor port, thus giving the motor a larger charge volume and consequently increasing the motor power.

When the motor develops too great power and runs above normal speed in the slightest degree the governor pulls

the slide, GV, to the left, which gives the mixing chamber more air, thus decreasing mixing chamber suction and so decreasing charge richness and also decreasing the effective area of the mixture port opening to the engine, and effectively and instantly reducing the motor power so long as the motor runs at all above its normal speed.

The use of the right hand adjusting plate is to vary the right hand air intake port area, so that the mixture will be of correct fuel richness. Moving the adjusting plate to open the right hand port decreases the mixture richness, while moving the adjusting plate to close this air intake port gives more suction in the mixing chamber, and thus increases the mixture richness.

The motor start is made by operator putting his body weight on fly wheel arms. A compression release is supplied.

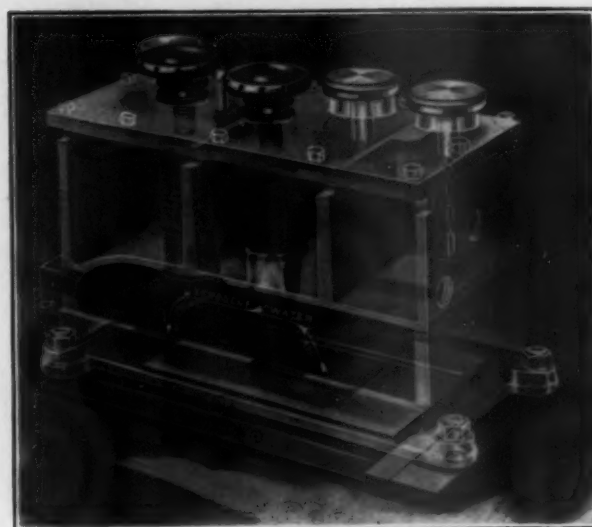


Fig. 7. Skeleton View of Higgins Carburetor

This view shows the needle valves and ports to motor, which are more or less opened and closed by a butterfly-governor action to make the mixture suit the motor power and speed. The needle valves are adjusted by the tester at the factory and need never be touched again.

As soon as the motor starts on gasoline the operator opens the kerosene needle valve to its index mark, with the result of a very few working strokes made with too much fuel and, of course, smoky exhaust, which speedily ceases and the motor then begins to run sweetly at fixed speed and holds this speed until overloaded.

### Factory Starting and Testing

The carburetor air intake is piped as high as may be under the cab roof to avoid dust, but is not screened against dust entrance.

The time required to start the motor and make it ready for work is about 45 seconds, average. The weight of the complete carburetor assembly, same for all motors, is about 43 lbs.

### Governor and Variable Speed

The Secor governor is bevel gear driven from the cam shaft, and inclined 10 degrees to the horizontal, same speed as crank shaft.

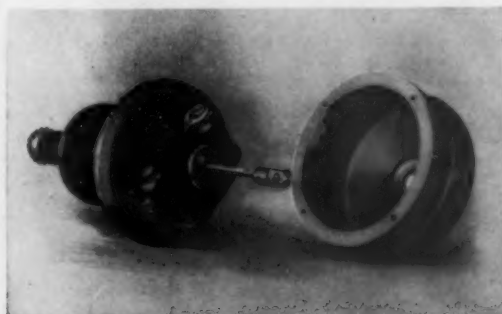


Fig. 8. Secor Kerosene Motor Butterfly Governor and Casing—Governor Runs in Oil



The integral steel castings bell crank governor arm is 3¾ lbs. weight, 3 in. from pin eye center to over the cylinder bob, and 2¼ radius from pin eye center to collar lever center, with coil spring at each end of bobs, springs calibrated by hooking into different holes.

The governor spring's tension fixes the motor speed.

While it is correct to say that the motor runs at a fixed speed, this speed is graduated by a latched lever, notched quadrant and spring so arranged as to augment the governor

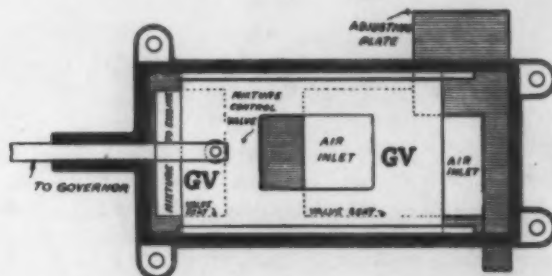


Fig. 9. Diagrammatic Plan of Higgins Carburetor Mixture Control Valve—Governor-Actuated

bobs spring effect and thus vary the motor speed from 300 to 425 r. p. m., each lever setting giving a fixed speed of its own.

### Fuels

Although using kerosene as a regular practice the motor works perfectly well with gasoline, or with the lately introduced "Motor Spirit," selling at about three cents less than gasoline. This "Motor Spirit" also works perfectly well in any gasoline motor.

### Mr. Secor's Opinion as to Kerosene for Automobiles

As the world's leading expert in kerosene motors, Mr. Secor's opinion as to the successful use of kerosene at 5 cents or 6 cents per gallon vs. gasoline at 20 cents or more per gallon,—these two fuels not varying much in contained heat units,—are deeply interesting to all motorists at this moment.

These opinions are here expressed in the form of question and reply as giving Mr. Secor's views in more specific detail than otherwise readily obtainable. The following questions by the writer were answered by John A. Secor at LaPorte, Ind., as follows:

Can the internal combustion motor show as much flexibility, that is to say as low a speed and power and as high a speed and power, when burning kerosene as when burning gasoline for fuel?

My experience shows that it can.

Can the internal combustion motor adapted to kerosene or crude petroleum for fuel be durable and reliable when made as light in weight as a gasoline motor showing equal maximum brake horsepower?

It can.

Then, in your opinion it is practicable to substitute kerosene and crude petroleum motors for gasoline motors for driving motor cars?

At present, I know of no reason why this cannot be done.

Which fuel, kerosene or gasoline, demands the more costly motor construction to be flexible, efficient and entirely reliable and satisfactory in motor car driving?

I believe there need be no material difference in the production cost of the motors adapted to burn kerosene and those adapted to burn gasoline.

Then, in your opinion, there is absolutely no mechanical or operative objection to the use of kerosene and crude oil burning internal combustion motors for motor car driving?

I know of none.

Is electrical ignition satisfactory for kerosene motors?

Absolutely so.

In your present large practice with kerosene motors does magneto current ignition give reliable and satisfactory results?

The results with magneto current ignition in my present practice are reliable and in every way satisfactory.

Do you use jump spark or make and break spark plugs with your kerosene and crude petroleum motors?

Make and break spark plugs exclusively, "Meteor Metal" contacts?

How does the make and break spark plug compare with the jump spark plug in the points of first cost, certainty of ignition, frequency of cleaning required and total upkeep cost for equal hours of actual running time, say for a year?

The first cost of make and break spark plugs need not exceed the first cost of high quality jump spark plugs. The make and break mechanism, however, makes the prime installation cost of the make and break spark greater than that of the jump spark plug.

In point of certainty of ignition in actual use, I believe the jump spark is not to be compared with the make and break spark, no matter what fuel is used.

As to the frequency of spark plug cleaning required. I now show you this make and break spark plug in the precise condition in which it was removed from one of my kerosene tractors after 2033 hours of running with no cleaning, and as you can see, it is still in serviceable condition, and to all appearance equal to another 2000 hours of duty without having anything at all done to it.

For extended service, and counting the delays caused by jump spark ignition failure, and the actual time cost of jump spark plug cleaning, the make and break spark is by far the more economical installation. In my own practice I have successfully used the jump spark plug, but at the cost of frequent delays for spark points cleaning, and of a much more costly grade of crank box oil. In the case of this plug I am showing you the crank case oil cost about 11c per gallon, whereas if jump spark had been used the crank box oil would have cost not less than 35c per gallon. In fact it is economy to use nothing but the very best grades of crank box oil with jump spark ignition, as dirty points are the most frequent cause of motor delay. No more low priced crank box oil than of high priced are required for equal service. The only advantage gained by the use of high priced crank box oil is less soot production, hence less spark plug cleaning demanded.

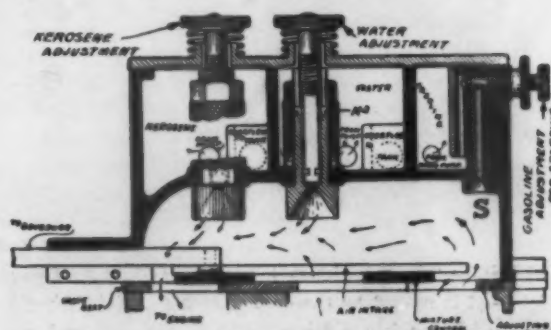


Fig. 10. Longitudinal Section of Higgins Carburetor Showing handling of kerosene, gasoline, and water, and permanent adjustment means

In your opinion, does a kerosene or crude oil burning automobile motor demand the presence of water inside the cylinder to obtain the best results in points of motor flexibility and fuel economy with crude oil and particularly, is it needful to use water in the cylinder to avoid sooting, or in other words to insure perfect combustion of crude oil fuel in an internal combustion motor?

While in some rare instances it may be economy to use crude petroleum fuel, kerosene is, generally speaking, the lowest cost and most all round economical liquid fuel for small internal combustion motors, and my own extended experience fully warrants the statement that from about half power upward a gradually increasing addition of water to the cylinder charge is of very great value in reducing heat and delaying combustion, and thus giving less initial pressure with increased mean effective pressure on the piston, and also aiding in perfect combustion.

Would you advise placing a governor on an automobile motor?

I certainly would. The governor can be fitted with the same motor speed varying device we use on the tractor motors and so give any motor speed whatever within range of the motor possibilities, with absolute certainty of instant motor speed change from the driver's seat. The governor, in my opinion, can be made small, light, low cost, and durable without difficulty, and will add to motor control reliability without any off-setting drawbacks whatever.

### A NEW POWER ELEVATING AND DUMPING BODY

Welch & Sutherland, of Fitchburg, Mass., have placed on the market a power elevating and dumping body for motor trucks which combines with extreme simplicity a very powerful and durable equipment. The novel part of the device consists of two steel racks which elevate the body to 45 degrees and when down are about 18 in. above the ground. At no time in the movement up or down do the ends of these racks get nearer than 14 in. to the ground.

This hoist is hinged at the end and retains its full elevation at this point when the front is elevated. This body is equipped with an automatic stop which renders it fool proof, and makes it impossible to start the motor until the body has been lowered. Another unique and valuable feature is a centrifugal brake of very simple design which limits the speed of the descent.

The body shown is of 5 tons capacity mounted on a Peerless chassis—and when down in roading position presents a fine solid business-like appearance, as the elevating mechanism is so compact it permits the body to come down close to the chassis rather than keep it up on high blocking or superstructure.

A detailed description of the mechanism is as follows:—A small gear is placed on the propellor shaft just forward of the transmission. Directly above the propellor shaft and parallel with it, is a shaft with large gear which slides endwise and meshes with gear on propellor shaft when the hoist is required. This gear is operated by a lever at driver's left hand. When the body is to be brought down this gear is slid out of mesh and leaves no moving parts whatsoever in contact. The shaft carrying the large sliding gear has on its rear end a bevel pinion which meshes with a large bevel gear mounted on a shaft running crosswise on the chassis; this shaft also carries a small pinion which drives large spur gear on second shaft across chassis. This second shaft has on its outer ends a large powerful pinion of special design which meshes with the racks, and revolving, pushes these racks

to the elevated position. These pinions and racks are provided with cages and back rolls to prevent the racks from jumping out of mesh, but the formation of the teeth and the action of the hoist are such that the tendency is to cling together, and the cages and rolls are not absolutely necessary.

The mechanism throughout is extremely simple and suggestive of tremendous strength, and its elevating to 45 degrees with the possibility of stopping it at a desired lower angle, makes it a practical equipment for any class of work where dumping bodies can be used.

### MOVERS SAVE TWO DAYS OUT OF THREE BY COMMERCIAL CARS

On long distance hauls movers are saving two days out of three by delivering with commercial cars. A conspicuous example is that of the Liberty Storage & Warehouse Company, of New York. Recently this company delivered by Alco truck a load of household furniture to Huntington, L. I., and returned to the warehouse inside of ten hours, covering a distance of 87 miles. The truck pulled up to the loading place at 3 P. M., was loaded, delivered its cargo and returned before 1 o'clock next morning, ready for another load.

When horses were used on such work the arrival at Huntington was made during the evening of the first day and another day was required for the return trip to New York. After such a strenuous ordeal as this the horses were not used on the third day.

Aside from this saving in time by the use of commercial cars, the expense of stabling the horses over night and the hotel bill of the driver and two helpers are now saved by this concern.

An instance of a commercial car saving three days out of four is that of Coutu Brothers, of Central Falls, R. I. A load was moved from Central Falls to Ipswich, Mass., a distance of 75 miles, in one day, by an Alco truck, in the service of this concern.

Formerly, on such trips, four horses took four days to make this trip. Thus the number of horses replaced by the commercial car is practically sixteen.

The saving in this particular instance is extremely large, as a three days' hotel bill of a driver and two helpers and the expense of stabling of four horses for three days are saved by the commercial car.



The Welch & Sutherland Dumping Body



### Testing Federal Trucks

Only one of the numerous tests to which each Federal truck is put before it leaves the factory. A 2250 lb. cast-iron block is hoisted upon the chassis and carried through the entire test, which averages about seventeen hours, or a distance of about thirty miles. After the road test and after proper adjustments have been made the trucks are sent to the paint shop. Just before the shipment is made a final inspection is given over a stretch of six inch sand in the yard and over three miles of city pavement.

## How the Commercial Car is Assisting Contractors

### Examples of the Economical Use of Trucks Even on Short Hauls on New York Aqueduct Work

**T**HE modern contractor is noted for scrapping machinery which is partially worn out or antiquated in pattern. Many contractors do not care to figure on a job unless it will pay for new machinery while the work is being carried on, and a fair profit after this machinery has been scrapped or sold second hand after the job is completed. In contractors' work, where excavations, foundations, etc., are being made, there must always be allowances for the unexpected, which very often happens. Quicksands, washouts, hidden springs, unexpected rock formations, etc., are encountered, and bids have to cover all such emergencies. If the work is successful and these difficulties are not met with, there is a big profit which offsets to a certain extent some former job where "just one thing after another happened." It is but natural, therefore, that we find the large contractors purchasing trucks in quantity, and working them to the limit, with the idea of selling them at the end of the job for what they will bring. The feeling seems to be "work the machines for all they are worth and make them pay for themselves and a profit to us and get new ones for the next job." Large contracting companies that are carrying on several kinds of work, and therefore can use a fleet of trucks continuously, are not as apt to treat the truck in the manner above mention-

ed, but keep the machine in shape to be instantly used on any work which may be undertaken.

#### Trucks Operated Twenty-two Hours Per Day

In New York City at the present the work on the new water supply aqueduct, probably the most stupendous of its kind ever undertaken, is being pushed with all speed to a successful completion. The modern motor truck is playing an important part in this construction. The Pittsburgh Construction Company of New York, is at the present time operating thirteen trucks both day and night. These vehicles are of Garford, White, Vulcan and Saurer makes. The Garfords are of 5-ton and the Vulcans of  $7\frac{1}{2}$ -ton capacity. These machines are operated 10-hour shifts during the day, and again on a 10-hour shift during the night, and as each of these is liable to run over, the vehicles are actually in use on an average of 22 hours out of the 24, which leaves scant time indeed for the necessary oiling, adjustments and minor repairs. At present the work consists of hauling trap rock from some five or six shafts of the new aqueduct. This material is carried to various dumps where made land, at points along the Hudson River such as at the foot of 126th Street, is being formed for the use of the New York Park Department.

The 3-ton covered rack body White truck is used as a distributor of tools and supplies which must occasionally be delivered at the various shafts without delay. Its center of operation is the 167th street storehouse where everything from spikes to massive machine tools are stored.

#### Trucks More Economical Than Horses on Two Mile Hauls

It is usually conceded that gasoline cars cannot compete with horses on hauls under three miles, but here is a case in which the average haul is not over two miles, yet the trucks are actually cutting horse costs in two. The writer has found other contractors who are saving money over horses on hauls as short as one-half mile. This proves that no general statement can be made as to the minimum length of haul on which a truck is cheaper than a horse, as conditions in each individual case vary so widely.

#### Up-to-Date Loading Methods

The work is being done in very modern form. Loading is accomplished by overhead chutes,  $7\frac{1}{2}$  tons being placed on a truck in less than three minutes. Large wooden structures are constructed over the various outlets or shafts, which are numbered. The material, which is in most cases broken stone known as trap rock, is conveyed to the top of these structures by means of elevators and hoists and dumped into large hoppers which have a slanting base sloping toward the street



Two Views of the Electrically Operated Derrick in Use at the Dumps by the Pittsburgh Contracting Company on the Aqueduct Work.

The body is shown just being returned to the truck. In the closer view is seen the shed, which covers the derrick operator, and the car used by one of the officials for visiting the various shafts.

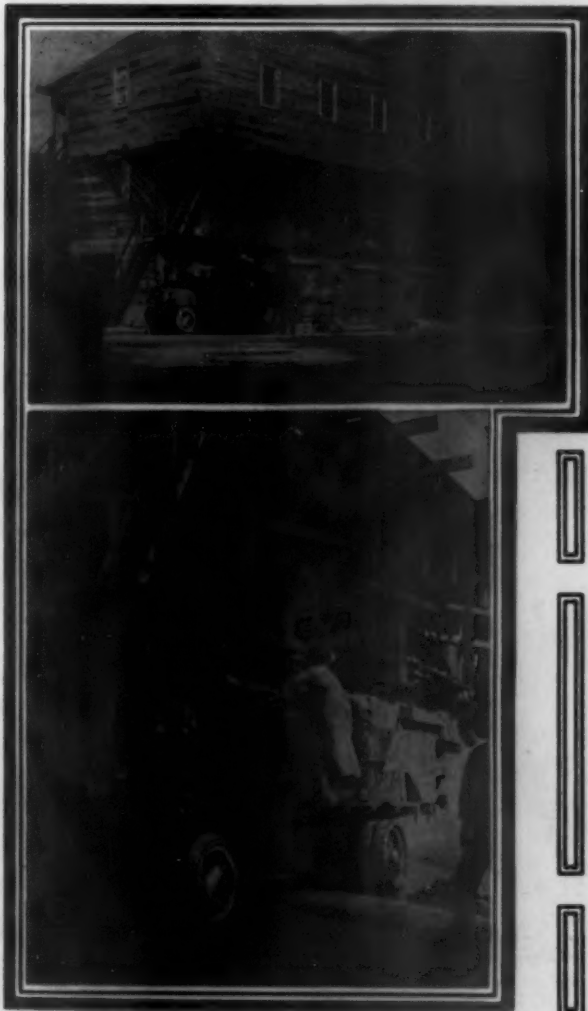




at which side are the loading chutes. A truck load consists of a removable steel bucket which holds anywhere from  $3\frac{1}{2}$  to  $7\frac{1}{2}$  tons. The truck drives under the chute, and an attendant operates a slide which allows the rock to fall by gravity into the bucket on the truck, the slide being closed when in the judgment of the operator the truck is loaded to its capacity. It can easily be imagined that the trucks are often loaded beyond their capacity, in fact it is safe to say they are almost always loaded beyond their rated capacity. The truck then starts for the dumping point, making its return at an average speed with full load of 8 to 10 miles per hour. The character of the pavements traversed vary considerably from the different shafts. From No. 10 at 136th Street and Madison Avenue, the run to the dump at 126th Street and the River is over smooth asphalt pavement with the exception of the lower part of 126th Street where cobbles are encountered and railroad tracks have to be crossed. This is very hard on the machines and the tires show the effects.

### Corduroy Road on the Dump

Considerable difficulty was experienced in driving the heavily loaded trucks over the newly made dump to the point



**Wooden Tipple for Overhead Loading**

Two views of the Pittsburgh Contracting Company's tipples, where the trucks are loaded as shown, by chutes, receiving from four to seven and a half tons in half as many minutes. Tipple capacity, 140 cu. yds.



**Electric Fore-Wheel Stone Truck**

Stone wagon converted into truck, operates at cost of about \$8 per day, which would cost \$13 by horses, hauling derrick stone from building foundation; in the service of Clarence L. Smith Company, contractors, New York City.

where the loads are emptied. It must be remembered that this work is going on day and night, and was continued last winter without interruption, regardless of weather conditions. At times the dump was anything but a place over which to drive a heavily loaded truck. At first large rocks were placed, then smaller rocks, then sand, and finally oil, in an endeavor to make a surface which would stand up under the repeated runs of the heavy trucks, but this was finally abandoned and after several experiments, the idea of laying a corduroy road of heavy three inch planks was adopted. These planks can be readily and rapidly laid directly on the dump, after same has been slightly leveled, and do not sink into the newly made ground. They also have the advantage that they can be quickly shifted when it is decided to change the layout, and during the winter time their surface is such that they can be readily cleaned of the snow. It may be mentioned that these vehicles were operated all last winter with practically no stoppages on account of the weather, and without anti-skid devices of any kind. Ashes were freely strewn on the slippery places, and as a large part of the distance the trucks travelled when loaded was down hill toward the River, and the upgrades negotiated empty on the return, no trouble whatever was experienced.

### Trucks Better In Winter Than Horses

When asked how the performance of the trucks compared in the winter time with horses, foreman Fay made the statement that there was no comparison. Just as soon as the streets became slippery, the efficiency of the horses was at once reduced by half. The number of trips which they were able to make immediately dropped off, as well as the speed at which the trips were made, in fact the average speed of the horses was under two miles and a half per hour, while as before stated, the average of the trucks was in the neighborhood of 8 to 10 miles. In addition to this, the horse vehicles, instead of carrying their full loads, were usually only partially filled, sometimes not carrying over a yard and a half of material to a two-horse team, instead of two yards and a half, while the trucks carry four and sometimes as high as six yards. In addition to this, the horses were pretty well used



**A Group of Trailers**

These were used for many months during the winter, each carrying its six-ton metal hopper body hauling trap rock and other material from the shafts to the dump.

up from the severe work on the slippery pavements, and required more frequent rests. The trucks run just the same, and operated at night as well as in the daytime.

#### Trailers Used

When the nature of the dump and the loading points permitted, stocky specially constructed 4-wheeled iron tired trailers were used. Each of these carried a metal bucket similar to that on the main truck, and each carried a load of 4 to 6½ or 7 tons, so that the trucks were actually moving at each trip in the neighborhood of 12 tons of pay load. In the accompanying illustration, a few of these trailers, which are not at the present time being used, are shown.

#### Trailers Not Properly Connected

At this point it may be well to call attention to the fact that the trailers might be used to greater advantage, if instead of connecting them by loose chains to the trucks, they were attached by means of a pole operating a steering device on the wheels, as used abroad, so that the trailer would track the leading vehicle. This at once would do away with the necessity for an extra man on the trailer, as used in this particular installation during last winter. At the same time, it would facilitate handling the trailer through traffic, and on the corduroy roads at the dump. No difficulty was experienced in hauling these trailers as far as the ability of the trucks to pull the loads was concerned, but the connecting chains broke frequently and caused trouble.

#### Six-Ton Body Removed, Emptied, Replaced in Five Minutes

The method of discharging the load is by means of a derrick. The buckets, with their contents, are lifted bodily from the truck or trailer, swung by the derrick to the desired point, and dumped by a releasing mechanism. They are then swung back into position and then lowered into place on the truck. This whole operation is done in less than five minutes, and the truck on its way again. With the present arrangement of many dumps, the truck has to make a letter Y, and back under the derrick beam. This precludes the possibility of using the trailers, but by a slight rearrangement of the dump, a loop could be made of the corduroy road, so

that the trucks with their trailers could make a continuous circuit, under the derrick. If the trailers were arranged to automatically track the leading vehicle by a pole connection, one man could handle the entire outfit, and although the wear and tear on the truck would be increased, it would not be doubled, although the loads carried would be doubled. In this manner, the efficiency of the service would be greatly increased.

Up to the present time, the company has had no adequate facilities for caring for the vehicles, and what work was done on them was supplied by a regular garage at the usual garage rates. Now, however, a corrugated sheet iron garage is being constructed, and of sufficient size to house all the vehicles. This is located on the 126th Street dump. Gasoline can be taken on from a supply pipe outside the garage, at which point the corduroy road is sufficiently wide for two or more vehicles. This will undoubtedly decrease the maintenance cost to a certain extent.

The drivers are very competent men, and are paid on an average of \$22 a week, and for overtime. They are not required to care for the vehicles, not even to oil them. This is done by the garage men.

#### Comparative Cost of Hauling by Motors and Horses

The cost of haulage by motor and horse is shown in the accompanying table, which is a complete and accurate record of these vehicles since their installation. Rough estimates showed at once that it cost in the neighborhood of 75 cents per cubic yard to haul this material to the dump by horses, this estimate being based on paying \$6 per day per wagon for the work to an outside contractor, which was the method previously employed. This did not include any of the help at the dump, such as derrick hands, etc. By trucks this cost dropped immediately to 40 cents per cubic yard, and included the wages of the derrick man, and several laborers at the dump.

#### Trucks Profitable Despite Inadequate Facilities

The Watson Company, of New York City, a contracting firm doing a large amount of work for the Park Department and the new aqueduct, is now using twelve Garford 6-ton

(Continued on page 49)



**Truck Carries Tile**

The Watson Contracting Company's Garford being loaded with tile from barge. Owing to this being an unusual occurrence, no special facilities have been arranged for power loading.



## The New One-Ton Selden



**T**HE SELDEN MOTOR VEHICLE COMPANY, of Rochester, N. Y., has recently placed on the market its one-ton truck. This job is said to be the most rugged one-ton truck on the market. The frame, which is of pressed steel channel section, is tapered at both front and rear and has a depth at the center of  $5\frac{3}{8}$  in. The wheels are of heavy artillery type, rectangular section spokes, equipped with  $36 \times 3\frac{1}{2}$  in. front tires.

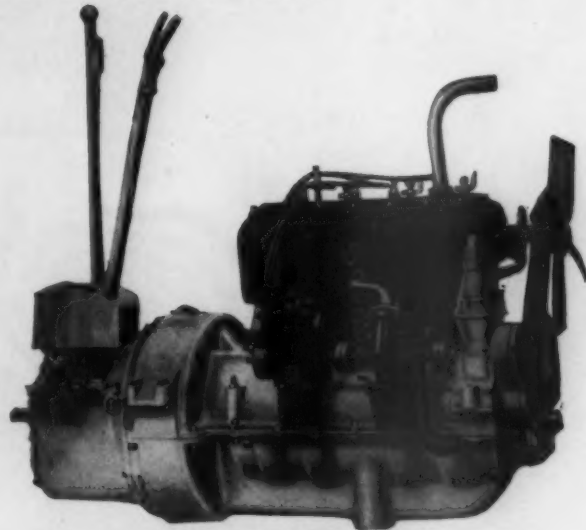
### Special Features

There are many details of construction which show originality and forethought on the part of the designer. Trouble is often experienced in trucks at points where bolts pass through thin sections of pressed steel on account of holes becoming elliptical in shape. At every point in the Selden where a bolt passed through such a flange, for example the bolts holding the motor to its sub-frame, a strip of  $\frac{3}{4}$  in. thick steel is countersunk riveted to the flange and the bolt passes through both, giving it a suitable hold. Fenders are arranged on their supports and so held by a set of screws that they can be instantly removed by a man on the road at any time if it is desired to get at parts of the engine, or for adjusting the carburetor, etc., so that he does not have to work over the fenders. The front cross frame is also made to be quickly removed. The steering column is rigidly supported to the upper part of the dash by a light but stiff triangular casing so that it can be used as a handle in getting in and out of the truck and abuse will not loosen it at the base.

### Arrangement of Units

The general arrangement is engine under the hood at the front. Dry multiple disc clutch. Transmission is three speeds forward and reverse type, sliding gear, forming part

of the unit power plant, which is four point suspended. The drive is by propeller shaft to the jack shaft and by a set of roller chains to the rear wheels.

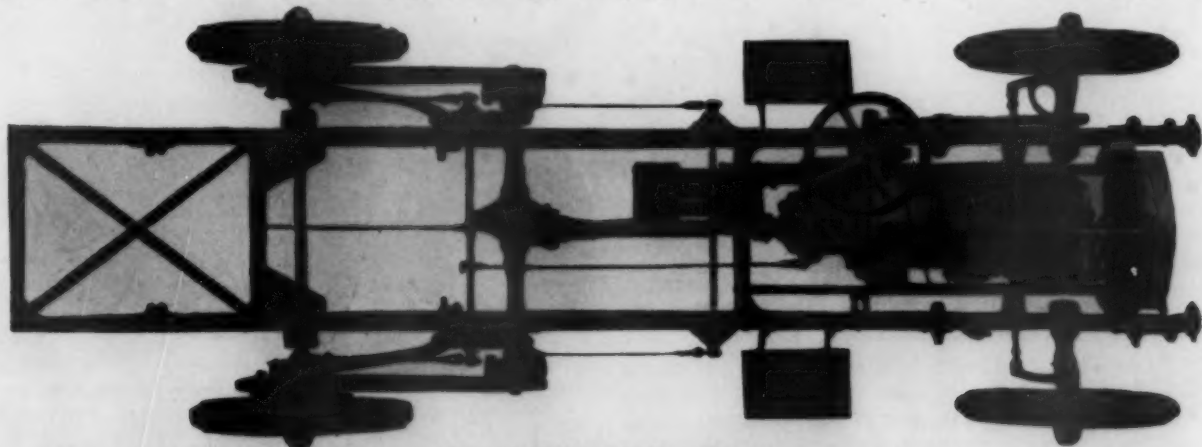


**Selden Unit Power Plant**

This unit is of Continental construction. The cylinders are  $3\frac{1}{4} \times 5\frac{1}{4}$  in.; governor of centrifugal type. Dry multiple-disc clutch inclosed; three speed and reverse sliding gears.

The springs are of semi-elliptical type, the front and rear being 42 in. in length by  $2\frac{1}{2}$  in. width and rear 48 in. by  $2\frac{1}{2}$  in., both shackled at the rear. The rear springs are under-slung, giving a low body position.

There are two sets of brakes, both internal expanding, the foot brake being on the jack shaft ends while the emergency brake is controlled by center hand lever, operating



**Plan of Selden One-Ton Chassis**

Note the compact motor at the front, with dry multiple-disc clutch and change-speed mechanism as a unit. Drive is by side chains from the jack shaft. Attention is called to the fact that all brake pull rods are parallel to the frame line.



**Selden Radius Rod**

This rod engages the outboard ends of the jack shaft by the straps shown; same have a spherical bearing surface provided with grease cup. Adjustment nut is shown. The axle passes through the large space at the rear end, the radius-rod pivot being at the rear of the axle instead of at the front, as is usual.

expanding; bands faced with Johns-Manville heat resisting linings, operating against cast steel drums held to the spokes by six "U" clips and carrying the driving sprocket ring. These brakes are 16 in. diameter by 2 in. face.

The jack shaft is of semi-floating type, mounted on high duty roller bearings and is of Selden design, based on Standard Weston Mott parts. An adjustment for wear is provided

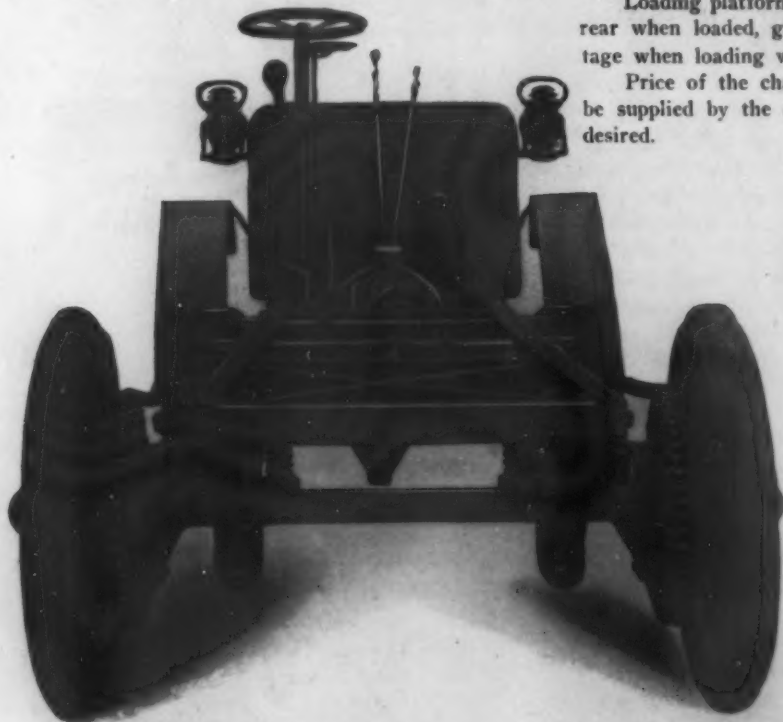
in. The frame width is 32 in. and without bolster to raise the body, the maximum outside width is 48 in.; with a 3 in. bolster the width can be 52 in. and a bolster of 10½ in. will raise the body clear of the wheels so that any desired body width can be used.

**Selden Jack-Shaft Assembly**

Showing the jack-shaft brakes at the outer ends. The cast-steel supports to the frame are also shown, and at the outboard end, the spherical surface, which is gripped by the forward end of the radius rod.

Loading platform height is 31 in. from the ground at the rear when loaded, giving an accessible platform, an advantage when loading with heavy freight.

Price of the chassis is \$2000. Bodies of all types will be supplied by the company or by special body builders if desired.

**Rear of Selden One-Ton Truck**

Showing the heavy, square-section rear axle, underslung rear springs and auxiliary springs. The method of mounting the front mudguards is also shown; the removal of a single set screw from each supporting arm permits the guard to be taken off.

on the driving bevel pinion in the form of a lock nut back of the thrust bearing. Driving shafts are of special alloy steel, heat treated, 1¾ in. in diameter. The jack shaft itself is slung to the under side of the frame by spherical bearings so that it is not affected by distortion of the frame, due to road inequalities.

### Bodies and Loading Space

To provide for various body sizes two lengths of chassis are supplied. Model J has a wheel base of 125 in., allowing for loading space back of the seat of 102 in. Model JL has a wheel base of 145 in. with a maximum loading space of 122

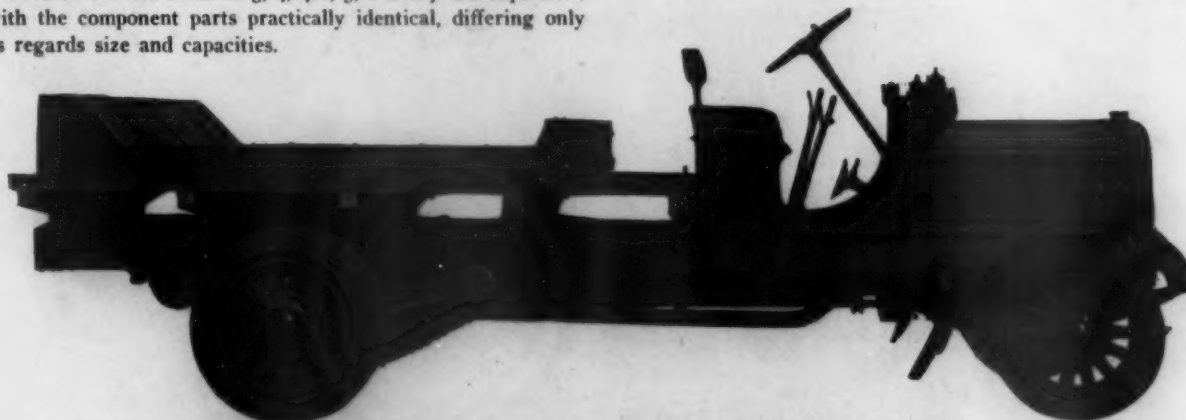
**Dry Multiple-Disc Clutch, Gear and Brake Levers of Selden**

This clutch is operated without lubricant, the advantage claimed being that it lets go instantly upon its release. The center gear-shift mechanism and the brake and gear-shift levers are also shown.

## Vulcan Truck Made in Six Sizes

The Vulcan truck is a powerful piece of mechanism, with proportions that are ample, yet it has graceful lines and a pleasing appearance, being designed and built for service by the Driggs-Seabury Ordnance Corporation, Sharon, Pa. The Vulcan trucks are made in 3, 4, 4½, 5, 6 and 7 ton capacities, with the component parts practically identical, differing only as regards size and capacities.

belt tight. The radiator has a cast aluminum frame, is vertical tube or cellular, located on front with trunnion suspension. The splash and force feed lubrication system is employed. The Bosch magneto, which is located on the working



**A Seven-Ton Vulcan Truck Fitted With Platform Body, to Take the Large Buckets Used on the Tunnel Work in New York City, by the Pittsburgh Contracting Company**

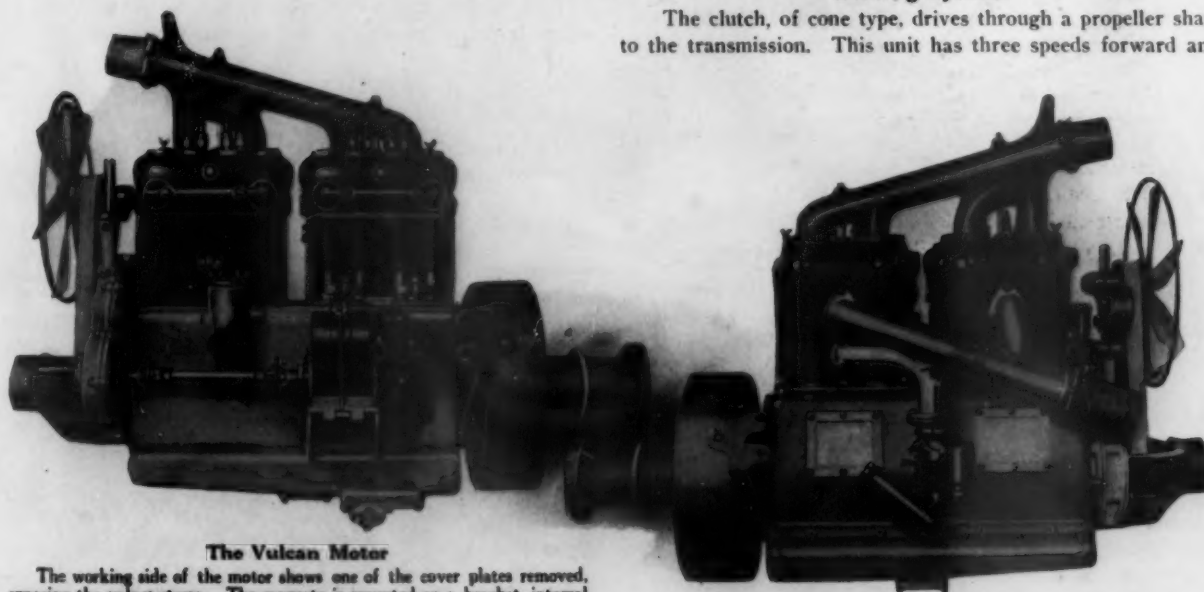
### Motor

The motor is a four-cylinder, four-cycle, water-cooled unit, built by the Driggs-Seabury Ordnance Corporation, and has a bore of 4¾ in. and a stroke of 5½ in. on the 3, 4, 4½ and 5 ton models and a bore and stroke of 4¾ x 5½ in. on

side of the motor, is supported by a bracket, cast integral with the crank case, and is driven by a universally jointed shaft, from the timing gears. The carburetor used on the Vulcan motor is of special design and made by the Driggs-Seabury Ordnance Corporation.

### Driving System

The clutch, of cone type, drives through a propeller shaft to the transmission. This unit has three speeds forward and



### The Vulcan Motor

The working side of the motor shows one of the cover plates removed, exposing the valves stems. The magneto is mounted on a bracket, integral with case, and is driven through a flexible shaft. A noticeable feature is the fact that all valves are located on one side, while both intake and exhaust manifolds are on the opposite side.

the 6 and 7 ton models. Valves are conveniently situated on the left side, and hand plates afford easy access to all moving parts, which are enclosed to exclude dust and dirt.

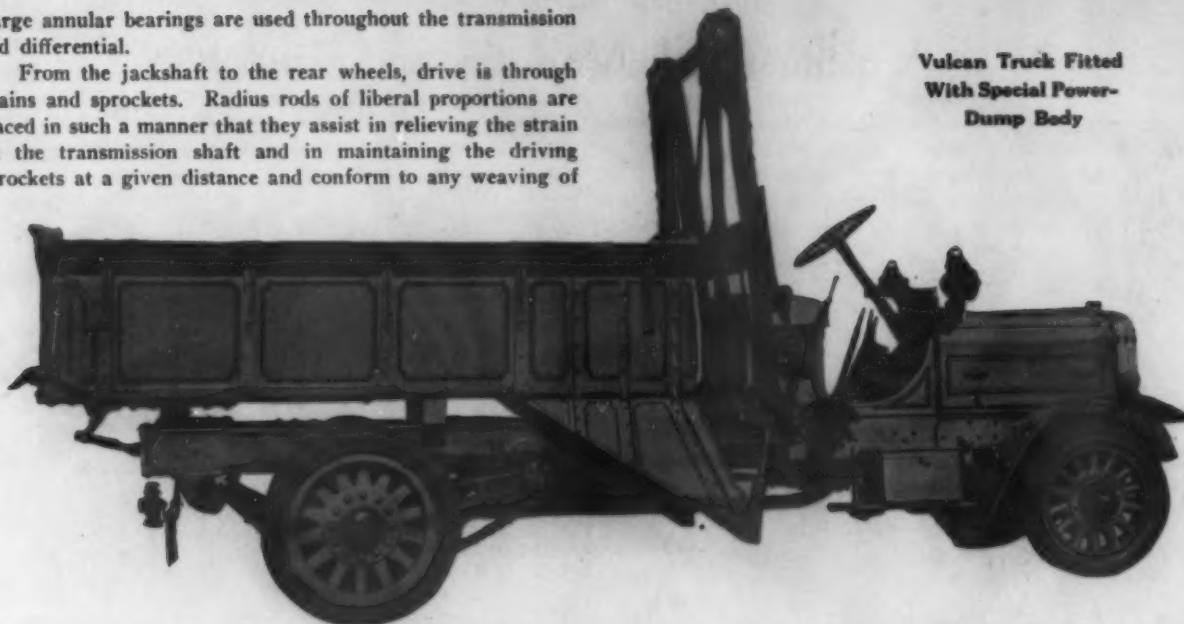
Cooling is by thermo-syphon system, with a fan mounted on a specially designed C spring, which tends to keep the fan

reverse and is located integral with the jackshaft, containing the differential in a separate housing. The case is of aluminum, stoutly ribbed over its exterior, with three-point suspension at the center of the frame. It is provided at the top with a hand hole and a circular cover, which can be quickly unlocked, rendering accessibility to the case a simple matter. The differential is flanged to the gear case, the entire unit being flexibly suspended on cross members of the chassis.

Large annular bearings are used throughout the transmission and differential.

From the jackshaft to the rear wheels, drive is through chains and sprockets. Radius rods of liberal proportions are placed in such a manner that they assist in relieving the strain on the transmission shaft and in maintaining the driving sprockets at a given distance and conform to any weaving of

**Vulcan Truck Fitted  
With Special Power-  
Dump Body**



the frame. The wheels are of the wood artillery type, with S. A. E. detachable rims, and have mounted on them solid rubber tires, dual rear.

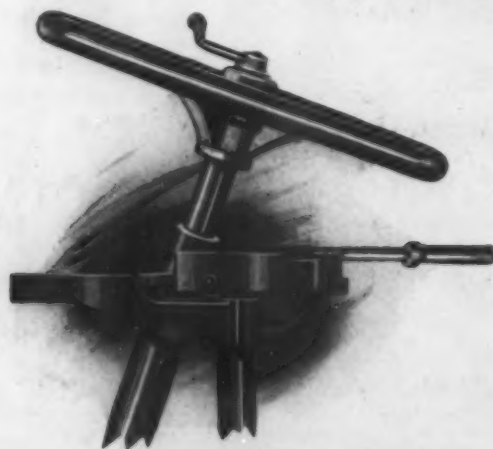
The service brakes are of the contracting type operating on drums, located on the jackshaft, inside of the main frame members. The emergency brakes are of the expanding type, operating in the drums located on the rear wheels.

The front axle is of I-beam section, with unusually heavy spring bolts. The steering knuckles are connected to the

steering joints are provided with spring shock absorbers, which soften the strain that would otherwise be borne by the steering worm and quadrant. The tie rod is of solid section.

The control device is embodied in a sliding dog clutch mechanism, which is attached to a quadrant on the steering post under the steering wheel. Three speeds are provided on the small sizes, with four speeds on the 6, 7 and 8 ton trucks. Shifting of gears is accomplished by moving the lever from notch to notch, and the gear box does the rest.

The Vulcan trucks have wheelbases from 144 to 162 in. and range in prices from \$3600 to \$5600, respectively.



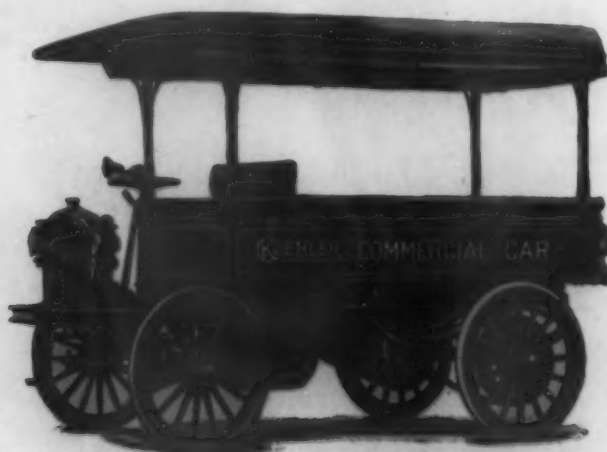
**The Vulcan Dog Clutch Control Mechanism**

center section by means of large yoke ends, with bearings of generous dimensions, provision being made at every point for lubrication. The rear axle is a carbon steel drop forging.

#### **Frame, Steering Gear, Etc.**

The frame is of pressed steel, channel section strengthened by cross members and gusset plates. At the rear, two diagonal pieces are riveted to the side and rear members, thus making a more rigid construction at this point. Both front and rear springs are semi-elliptic.

The steering gear is of the worm and wheel type, with steering arm of  $3\frac{1}{2}$  per cent. nickel steel, with ball end. The



**An Additional Koehler Model**

The H. J. Koehler S. G. Company announces the completion of an additional Koehler Commercial Car. This car possesses the same excellent design and all the features that have distinguished the Koehler Car in the past, together with many refinements and improvements. This model is equipped with 36" solid rubber tires, both front and rear, on demountable rims fitted on artillery wheels, Schbler carburetor, Bosch magneto and other accessories of high quality.

All of the Koehler models have been greatly improved, and the previous model with 48" rear wheels and 2" tires, will be continued in the Koehler line. This new Koehler model has a capacity of sixteen hundred pounds and is listed at \$750.



## The Palmer Fifteen Hundred Pound Commercial Car



THE plans of the Palmer-Meyer Motor Car Company, 5027 McKissock Ave., St. Louis, Mo., have resulted in the announcement of a 1500 lb. commercial car. Arrangements have been completed for the building of this car and the company has estimated its output at 300 cars per year.

### The Motor

A four cylinder motor with cylinders cast in pairs is used, combined in a unit power plant with a three speed transmission and Wells expanding disc clutch. The motor is of the long stroke type, has a bore of  $3\frac{5}{8}$  in. and a stroke of  $4\frac{3}{4}$  in. developing 26 h. p. Cooling is by a centrifugal pump, fan, and square tube radiator. The crank case is of aluminum and all

a fixed level in which the connecting rods dip. The excess oil flows back to the reservoir when it is thoroughly strained and recirculated.

The latest improved types of Schebler Model L carburetor and Remy model R. D. magneto are used. Clutch is of dry plate expanding disc type provided with frictional surface and spring adjustment.

The transmission has three speeds, forward and reverse; gears and shafts are heat treated, New Departure double row annular bearings being used for the shaft mountings.

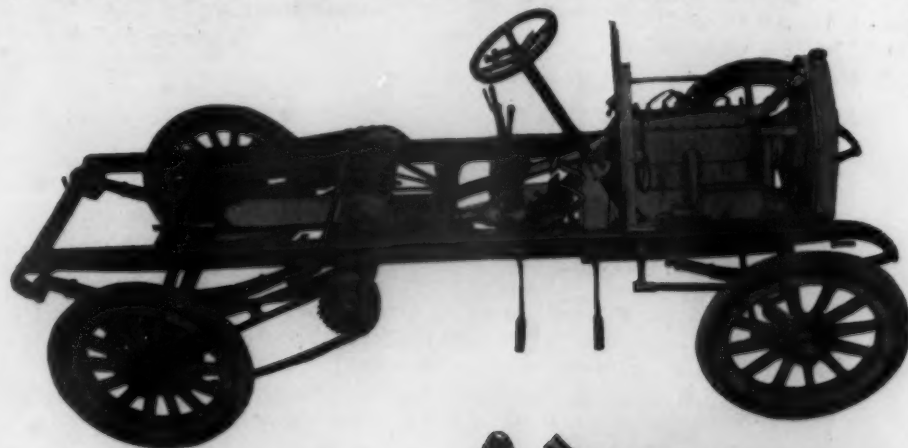
### Frames, Springs and Axles

The frame is pressed steel and provides a three point support for the power plant, which is provided with center

control for right-side drive. The steering gear is of the screw and nut type, arranged for fore and aft steering, with 16 in. hand wheel and  $1\frac{3}{4}$  in. post.

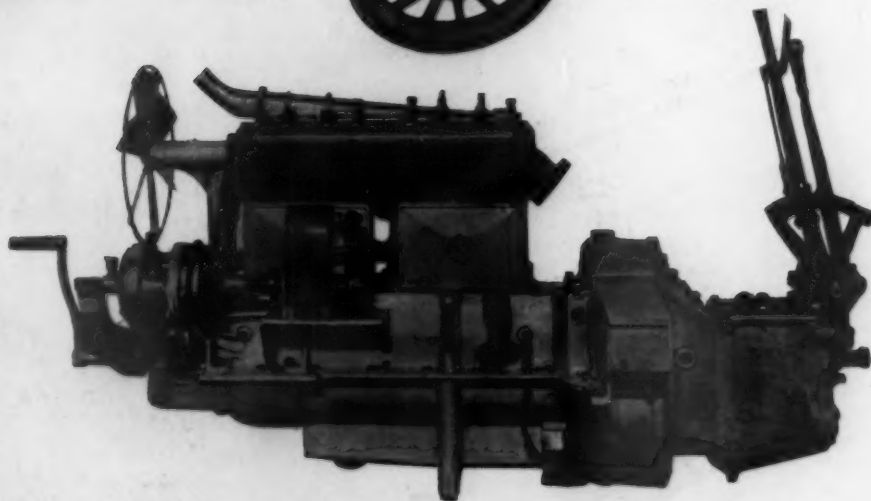
Springs are semi-elliptic, 2 in. wide, made from carbon crucible alloy steel. All spring eyes are provided with lubricators.

The front axle is an I-beam forging  $2\frac{3}{8}$  in. deep by  $1\frac{3}{4}$  in. wide. Spindles are 1 in. diameter. Rear axle is  $1\frac{3}{4}$  in. square, having  $1\frac{3}{4}$  in. spindles.



Chassis and Unit Power Plant of the Palmer Fifteen Hundred Pound Model

The price of this chassis in the lead is \$1450. Its wheel base is 110 in. The power plant consists of a 4-cylinder motor,  $3\frac{5}{8}$  in. bore,  $4\frac{3}{4}$  in. stroke. Cooling is by centrifugal pump, with square tube radiator. The transmission is of the selective sliding type, having three speeds forward and reverse.



bearings are nickel babbitt, divided and provided with shims for adjustment. Three main bearings are used, being of generous proportions. Cylinders and pistons are of special gray iron, being ground to size. Connecting rods are drop forgings of 40 carbon steel. Cams are forged integral with the cam shaft, while the timing gears are bronze, steel and cast iron. Valves are  $1\frac{3}{8}$  in. in diameter and the stems are enclosed.

### Lubrication, Clutch and Transmission

Lubrication of the motor is by constant level splash system circulated. A positive driven plunger pump, placed on the side of the motor in a very accessible position maintains

### Wheels, Tires and Equipment

Wheels are 34 in. in diameter, the front having twelve  $1\frac{1}{2}$  in. square spokes and  $2\frac{1}{2}$  in. solid tires. The rear wheels have fourteen  $1\frac{1}{2}$  in. square spokes and  $3\frac{1}{2}$  in. tires. Tires are S. A. E. standard, removal flange truck type.

Wheel base is 110 in. and the final drive is through single universal joint and side chains to rear wheels.

The chassis lists at \$1450, in lead.

The equipment comprises three oil lamps, horn, tool box and tool kit. Black enamel and brass finish is standard on all parts.

## Features of the New Willys Utility Truck



ONE of the latest comers into the field of light delivery trucks is the Willys Utility Car by the Gramm Motor Truck Company, Lima, Ohio. One of the distinctive features of this little truck is the fact that it is not a converted pleasure chassis, but is strictly a commercial proposition. These trucks are designed for carrying  $\frac{3}{4}$  of a ton and sell for the exceptionally low price of \$1250, production in large quantities being the aim of the makers.

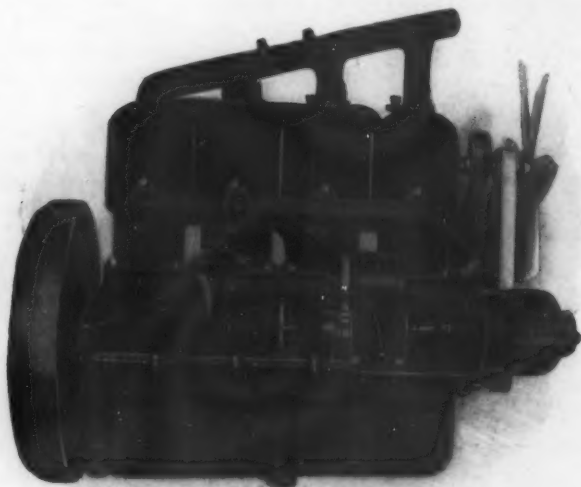
### General Specifications

The general arrangement of the truck is as follows: 4 x  $4\frac{1}{2}$  in. four-cylinder motor under the hood at the front; leather faced cone clutch with spring inserts, propeller shaft to a three-speed and reverse sliding gear jack shaft with selective operation. The drive from this point to the rear wheels is by side roller chains. The front axle is of I-section, with Timken bearings. The rear axle is of rectangular section, also on Tim-



**Willys Utility Car**

Capacity 1500 lbs., maximum 2000 lbs.; 30 h.p. motor, 4 cylinders, cast separately, bore 4 in., stroke  $4\frac{1}{2}$  in. Enclosed sealed governor; wheelbase, 120 in.; loading space, 96 x 48 in. Chassis price, \$1250.



**Willys 30 h.p. Motor**

Four-cylinder, 30 h.p., 4 x  $4\frac{1}{2}$  in., with enclosed and sealed speed governor

ken bearings. The springs are semi-elliptical front and rear, the front 45 in. long by  $2\frac{1}{4}$  in. wide, the rear 50 in. long by  $2\frac{1}{2}$  in. wide. The steering wheel is on the right, a worm and worm gear of irreversible type being used. The cross connecting link is at the rear of the front axle. The control levers are at the center. The wheels are of heavy artillery square spoke type, fitted with 36 x  $3\frac{1}{2}$  in. solid tires, front and rear. The frame is of the usual pressed steel, hot-riveted construction, with straight side members, slightly tapered at the rear ends.

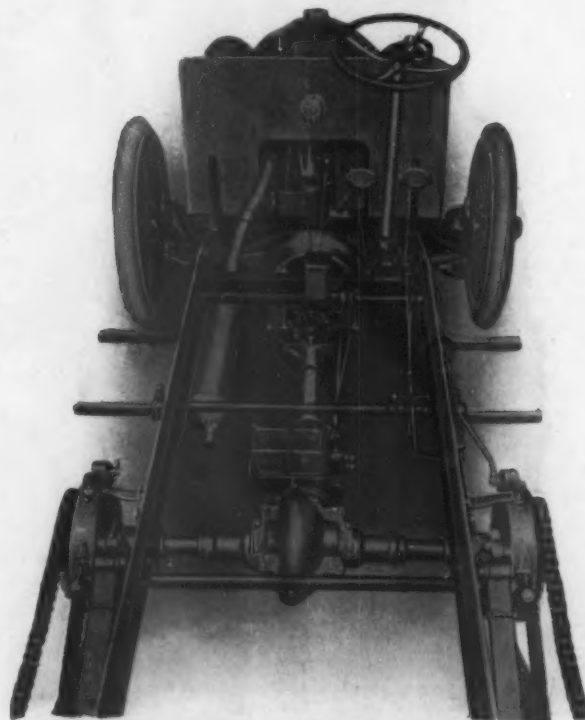
### Motor

The engine is of the same general type as that used in the Overland pleasure car, and although of the same bore and stroke, 4 x  $4\frac{1}{2}$  in., it is of much heavier construction, developing about 30 h. p. at normal speed. The cylinders are cast separately and are of L type, valves on the left. It is three-point mounted, by two arms at the rear and a single point under the forward end of the crank case on a dropped cross frame member. All gears are enclosed by an aluminum case virtually

forming part of the crank case. The crankshaft is supported in five bearings, all white metal. Cooling is by Thermo-syphon circulation, no pump used, aided by a six-bladed, flat-belt-driven fan at the rear of the radiator, from a pulley at the forward end of the crankshaft.

### Governor

All of these trucks are fitted with centrifugal ball governors, mounted in a neat aluminum case located at the rear end of the crank case, and driven from the rear of the cam shaft. This governor operates on a butterfly valve to control the mixture to the engine. Normally it is set for about 1200 r. p. m. of the engine, corresponding to about fourteen m. p. h.



**Willys Chassis**

Showing layout of units. Weight, 2800 lbs. Price of chassis, \$1250

# THE FOOL-PROOF TRUCK

BY LEN G. SHAW



WORTHINGTON'S face wore a puzzled expression as he handed Wright, his partner in the motor truck agency, a letter he had just finished perusing.

Wright read the missive through a second time, then laid it down without uttering a sound.

"Well?" queried Worthington.

Wright drummed lightly on his desk, but vouchsafed no reply.

"What do you suppose Palmer is driving at in asking me to call, Dick?" persisted Worthington.

"Give it up—unless he's going to have you trot around in his office so that he can tell you to your face what a punk lot we are," replied Wright, facetiously.

Worthington made a wry face, then relapsed into silence, as he busied himself with some specification blanks. Suddenly he swung his chair around and faced Wright.

"I saw Smallidge on my way down this morning," he exploded, "and he told me that Palmer deal was closed—they'd decided to take two of his machines."

"Well, what else could you expect?"

"Nothing, I suppose," agreed Worthington, "But what I can't understand is how they came to make such a showing. Their two-ton truck did more than our three-ton, and Palmer's got the figures to prove it. That's why Smallidge won out—and now he'll never quit blowing about it."

Wright grinned appreciatively.

"Cheer up, old top," he said, encouragingly, "you did your level best, and the angels could do no more. When you've done all you could you ought to wear a smile, even if you do ride in the hearse. Go over and take your medicine like a man."

Worthington went, prepared to accept as gracefully as possible, whatever might be handed him. He couldn't help thinking, as he sat in the outer office waiting for Palmer to finish with a caller, that it was a bitter pill he would be called upon to swallow.

Rivalry for the Palmer Company's business had been keen. You couldn't put anything over on "Old Man" Palmer. It was conceded that the concern which succeeded in furnishing the company trucks and making good with them had gained powerful leverage elsewhere. To sell the Palmer Company anything was to climb into the AA class.

Worthington & Wright had entered into competition with a half dozen dealers, and had come off with flying colors save in the case of Smallidge. With a smaller truck he had figuratively worked rings around them, and at the conclusion of the competitive tests had a comfortable margin of tonnage to his credit. Quite natural that he should get the business, but—

Further speculation was brought to an abrupt ending when the door to Palmer's office opened, as he ushered out a caller. Worthington saw it was Smallidge. At the same instant Smallidge glanced in his direction, and his face flushed.

"Hello, Worth," he said, waving a hand as he strode past, and affecting a jovial air, "good luck to you."

Worthington bit his lips, and his fists were clenched menacingly. Wasn't it enough that Smallidge should walk off with an order, without rubbing it in so deep?

"Come in, Worthington," said Palmer, ushering him into his private office, and drawing a chair up beside his desk.

When cigars had been passed, Palmer leaned back, threw one leg over the other, clasped his hands across his capacious waistline, and eyed his caller critically for a few moments. Worthington chafed under the scrutiny and longed for the agony to be shortened.

"You know the result of those competitive tests we held," began Palmer.

Worthington nodded.

"Smallidge's machine worked rings all around you, didn't it?" continued Palmer, his eyes narrowing.

Worthington could stand no more. His collar seemed about to strangle him, and great

beads of perspiration stood out on his forehead. His wrath knew no bounds.

"Look here," he began, with an angry tremor in his voice, "I know all that as well as you do. But if you've called me over just to throw those things in my face"—

Palmer held up a hand protestingly.

"Not so fast," he admonished, "you're in wrong on this whole proposition. What I called you in for was to tell you we had decided to purchase two of your trucks."

Again the color mounted to Worthington's cheeks. He gazed at Palmer critically, as though to make sure whether he heard aright. Palmer noticed the puzzled expression and smiled.

"That is just what I said," he continued, "We want two of your trucks."

"But Smallidge told me"—stammered Worthington.

"Never mind what Smallidge told you," interrupted Palmer. "If it is what I think he said he either jumped at conclusions, or deliberately misrepresented the facts. He just left here after learning the truth."

A little later, with a contract for two motor trucks tucked safely away in his pocket, and his composure having returned, Worthington turned inquisitor.

"I'd like to know, if you don't mind telling" he said, "how it came that you decided to take our machines when in the tests Smallidge made a more favorable showing."

"That's the funny part of the whole transaction," explained Palmer. "One point on which Smallidge laid great



"If there's anything I hate, its to have anybody try to put it over on me—and I'm only human."



stress in his talks with me was the fact that his truck was fool proof—geared to twelve miles an hour, and the driver couldn't speed it up beyond that point, no matter how hard he tried, which meant that when he got in a hurry he wasn't battering it all to pieces making time. I became suspicious when I got the first day's returns, and the report showed 100 miles, in addition to the time lost in loading and unloading. It didn't work out according to representations. The second day we had some stuff to be delivered at a point six miles from our warehouses, and the Smallidge machine was detailed to do the trick.

"According to what Smallidge had told me, it would take the machine one hour to make the round trip, exclusive of loading and unloading time. I had my superintendent keep close tab, and he found that the round trip was being made in an hour, aside from twenty minutes or so allowed for loading and unloading. One time after another this was done, and every trip gave the lie direct to Smallidge, who was so interested in piling up tonnage that he forgot everything else.

"We discovered upon investigation that the demonstrator had jammed the governor down, and was hitting it up around sixteen miles an hour, when we had been led to believe that it was a fool-proof car, incapable of making more than twelve.

"That settled Smallidge with me. If a man will misrepresent one point in order to make a showing, I'll not trust him on any other."

Palmer blew a smoke ring and watched it sail off into space before he spoke again.

"Maybe your machine isn't fool-proof," he continued, with a laugh. "I'll find that out later. But I haven't caught you misrepresenting things—so far. If there's anything I hate," and he brought a fist down with a bang, by way of emphasis, "it's to have anybody try to put it over on me—and I'm only human."

### MOTOR TRUCKS FOR STREET CAR TROUBLE CALLS

**Detroit United Railway Uses Two Federals For Fires, Derailed Cars, Trolley Repairs, Etc.—System is Like That of Fire Department.**

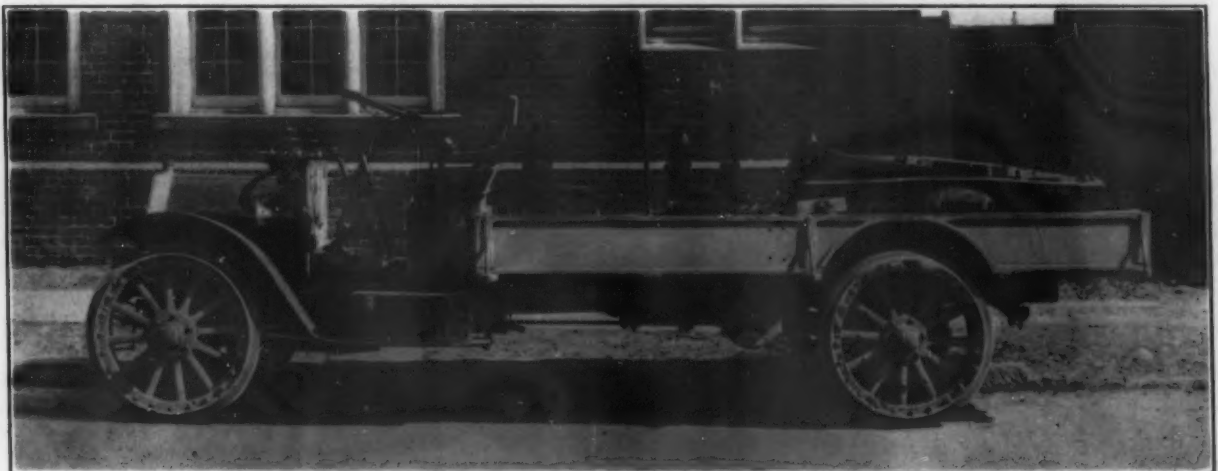
The trouble wagon used by the Detroit United Railway is a specially designed Federal Motor truck, built to order for the company by the Federal Motor Truck Company, of Detroit. This vehicle illustrates in a very emphatic manner how the motor truck is revolutionizing the work of public service corporations in general and street car companies in particular and how it solves trouble problems with a dispatch and an economy that makes "Dobbin," who has been relegated to a rear stall, hang his head in shame.

Ellsworth J. Burdick, superintendent of power for the Detroit United Railway and in charge of overhead and power stations, had two kinds of problems to meet. He had to maintain a wagon for fires, derailed cars and the like and one for the repairing of broken trolley wires. By adopting the motor truck and using two, one for each kind of work, he has not

only solved the difficulties but revolutionized these departments and he now maintains in the building at St. Antoine and Woodbridge streets, Detroit, an institution much like a fire house where during the entire 24 hours of each day there is constantly on hand a crew of four men for each wagon ready to hop in and speed away. These men sleep at the station and their trucks are backed in under their loads which are dropped into them by means of an air hoist, so that the same efficient and expeditious service is maintained as in a fire house.

The trouble wagon used for ground work was built by the Federal people according to body designs supplied by Mr. Burdick to meet his requirements. It has been in operation a year. The body is 11 ft. long and built on the frame and is about 5 ft. wide inside. The load is carried 30 in. above the ground. There is a partition 5 ft. back of the driver's seat. The back wheels are housed over, making two tool boxes about 9 in. wide and 3 ft. long. The object of the general design is to get a low center of gravity.

The second motor wagon Mr. Burdick designed and had built by the Federal Motor Truck Company is used exclusively



**Federal Truck Especially Designed and Built for the Detroit United Railway as a Trouble Wagon**

for overhead work; that is, it answers all calls when trolley wires are broken or need attention. It is equipped with a standard Trenton tower for the overhead work. It has a total extension of 17 ft. and closes down to 10½ ft., giving a very low center of gravity. The tires of this wagon are also Swinehart cellular. This wagon is kept at the same barn as the first and answers nothing but trouble calls. It carries a complete repair equipment, including guy wires, blow torches, buckles, etc., and is on the same war footing as the first wagon.

### REVISED AND CORRECTED REPORT OF OPERATION OF SEVEN AUTOCARS AT ORANGE, N. J.

By U. S. Express Co., June, July, Aug., Sept., Oct & Nov., 1912.

Total Disbursement for 7 Autocars for 6 Months	For 6 Mos. on 7 cars	For 1 Mo. on 1 car	For 1 car 1 day	Percentages
For Garage.....	\$539.00	\$12.83	\$4.90	10.4
Gasoline.....	762.12	18.15	.692	14.8
Oil.....	175.50	4.18	.159	03.4
Grease.....	61.49	1.46	.055	01.1
Alcohol.....	9.72	.23	.008	00.1
Repairs.....	208.30	4.72	.189	04.0
Tires.....	205.31	4.88	.186	03.8
Mechanic.....	56.00	1.33	.050	01.0
Interest.....	403.10	10.55	.405	08.4
Wages.....	2730.00	65.00	2.50	53.0
Total.....	\$5150.54	\$123.33	\$4.734	100%
Total idle days.....	30	.7		02.6
" car ".....	1069	25.4		97.4
" working days.....	1099	26.1		100%
" mileage.....	29823	948.1	37.2	
Packages delivered.....	72267			
" picked up.....	45698			
Total.....	117965	2808.0	110.4	
Cost per mile.....			.129	
" package.....			.0436	
" day per car.....			4.73	

Stable cost, 21 horses, 14 wagons for 6 months, 1911:

Interest.....\$264.45 \$4977.97\*

Expenses.....4713.52

Autocar cost 7 cars, 1912:

Operation.....1420.54

Stables.....805.14 2225.68\*\*

Saving.....\$2752.29

Further saving in pay rolls acct. 6 em-

ployees less.....384.37

Total 6 months saving.....\$3136.66

\* Feed, rent, vet., shoeing, repairs, heat, light, stable men and interest.

\*\* Garage, gasoline, oil, grease, repairs, alcohol, tires, interest and mechanic.

Note: Autocars were without any care for 5 months; mechanic put in charge on Nov. 1st, 1912.

### Ratio of Cost of Autocar Service to Gross Receipts for Six Months, 1912, as Compared to Horses and Wagons for Same Period During the Year 1911, and Relative Economy of Autocars Over Horse Service.

21 Horses, 14 Wagons—7 Autocars.

	June	July	Aug.	Sept.	Oct.	Nov.	Average
Wagons and Horses ..	15.64%	15.37	15.05	12.73	11.40	17.70	14.66%
For Autocars ..	9.05	10.07	9.89	8.25	7.17	9.68	9.02
Economy ..	6.59	5.30	5.16	4.48	4.32	8.02	6.54%
Totals ..							
Total cost Wagon Service 1911.....	\$1325.55	\$1204.63	\$1155.46	\$1298.87	\$1293.54	\$1662.93	\$7940.98
Total cost Autocars 1912.....	836.28	860.80	810.20	835.40	827.58	990.19	5150.54
Saving ..	\$489.27	\$345.74	\$345.26	\$463.47	\$465.96	\$682.74	\$2790.44
Percentage.....	35.44	28.52	21.21	35.60	35.80	41.00	32.97

Total net saving of Autocars over Horses and Wagons for 6 months.....\$2790.44

To which add: Acct. saving in payrolls—6 men less than in 1911.....384.37

Total saving on 6 months' operation.....\$3174.81

Deduct: Cost of stable rent and expenses, which was under lease but not used for 6 months and should not be charged against Autocar service.....805.14

Total grand net saving over horses and wagons for 6 months.....\$2369.67



Couple Gear Tractor Hauling Boiler

Here is shown a Couple Gear Tractor hauling a 100 h. p. steam boiler to a dam, a distance of nine miles. The trip was made across country, and grades up to fifteen per cent had to be negotiated.



The Seven Autocars Used by the United States Express Company, at Orange, N. J., Operation Figures of Which Accompany This Illustration

## Kerosene Carburetors\*



THE kerosene problem is exciting a great deal of attention, especially in the case of engines using large quantities of fuel. The rising price of fuel compels us to do something to meet the present situation. We, as carburetor designers, are obliged to work with engineers and designers of large tractor, marine and automobile engines. We have to join hands pretty closely with designers of engines to get them to make some little changes in order that we may get the best results in carburetion, using kerosene as a secondary fuel. In our early experimental work we tried to use a producer and found some difficulties which we were not able to overcome. We were not able to get sufficient power. Our first producer was a coil of pipe heated by the exhaust of the motor, a small quantity of air rich with kerosene being drawn through it into the main manifold of the engine and there rarified by air, lowering the temperature of the heated gas coming from the producer. Our next step was to build a larger producer. With this we found the same lack of power, which we believed due to resistance to the fuel passing through the producer. We then tried to force the fuel through by using a portion of the exhaust gases. The temperature ranged from 400° to 1200° F., about 900° giving the best results. The experiments were all on four-cylinder, four-cycle water-cooled engines, water being used to prevent preignition. After failing to produce the desired power, we laid the producer aside and experimented with injection methods, but found them too delicate for adequate economy and flexibility. We also experienced difficulties due to choking of small parts by carbon and dirt in the fuel.

We then followed along the line of vaporizing, breaking the kerosene up as finely as possible. We observed that the lubricating oil became very thin and that we were not getting good economy. As we progressed with our experiments and obtained an oil that gave the highest efficiency with gasoline, we began improving our method of vaporizing. Upon reaching a point where we were able to break the kerosene up finely enough we found the lubricating oil remained the same as when operating on gasoline. On all of the tests we used water except for light loads. When we were using the producer we did not experience the lubricating oil trouble.

### Wilcox-Bennett Vaporizer

Our present method of vaporizing is by a stand-pipe in the air passages, having seventy-five small jets. The stand-pipe is in a vertical position, the openings along its suction wall and the jets being brought into action by the increasing suction of the motor, the liquid level being above the lowest opening in the stand-pipe. This system gives us a wider range of flexibility, breaking the fuel up finely. We also have a water jet, using warm water from the motor jacket. We start on gasoline. As soon as the bowl becomes hot we turn the kerosene on and the gasoline off, opening the regulating needle valve slightly more. We use water only to prevent preignition. We bring the air into contact with the heated kerosene, admitting water afterwards. If the air were first saturated with water, or partially so, the hot kerosene would not mix with it as readily. We also used this method in our experiments with the producer.

We find that the intake manifold has much to do with equal distribution of the mixture to the cylinders. We do not recommend a large manifold, but strive to keep the velocity of gases maximum at full load. We find that at light loads we get condensation of gases and are sometimes obliged to put small fins or deflectors in the manifold. It is also necessary to taper the pistons slightly more at the head. If we did not do this we would be obliged to use more water to keep down the expansion of the piston heads, which would mean more fuel or waste of fuel, the expansion being greater with the use of the lower gravity fuels.

We use as a basis of comparison of the two fuels 0.7 of a pound of gasoline and 0.8 pound of kerosene per horsepower-hour. We use as little water as possible, only enough to absorb the excess heat. With better evaporation it is not necessary to use as much water, the heat energy being utilized more perfectly.

### Preignition

What usually appears to be preignition in a motor not suitable for kerosene, the first bumping that occurs, is generally the slight seizing of the pistons. Real preignition comes from hot valves, pistons, spark-plugs or any small projection in the cylinder not properly water-jacketed. We avoid heavy points on spark plugs such as are generally used on mica plugs, and prefer a plug with small light wires as they cool very much better. We also prefer to have the plugs in the clear, not in pockets. Sometimes, how-

ever, it becomes necessary when the lubrication is bad to place the plug over the exhaust valve, although we prefer to have it water-jacketed rather than in a cap over the valves.

### Size of Manifolds

Automobile engineers lean toward large valves and manifolds, with easy sweeping curves. We prefer to make the turns more abrupt when kerosene is used and find that a large valve is not as easily cooled as a small one. Too small a manifold has a throttling effect on the motor. In a motor designed to run at 1200 r. p. m. we work to keep the velocity of the gases as high as possible. However, where it is preferable to use a large manifold we retard the opening of the inlet valves, which gives a partial vacuum in the cylinder, starting the gases with a sudden rush and assisting in breaking up any condensation in the manifold. We have in our experimental work retarded the inlet-valve opening as much as 25 deg. on a long-stroke engine, without loss of power and with a very marked gain in flexibility. Where we have a late opening of the inlet valve we shape the cam so as to leave the closing the same as before.

We do not pre-heat the air. If we did so we would not be able to take in as large a charge of gas and would get preignition much earlier, as well as a loss of power.

In a recent test on a four-cylinder engine it was necessary to put in two small fins in the manifold just below where the manifold branches. These fins, of course, help to distribute the mixture and give better economy with less likelihood of missing.

We use the same compression with gasoline, kerosene or alcohol, although we do not get the best economy with alcohol in this way.

### Lubricating Oil

We have to contend a great deal with lubricating oil. An oil that will burn readily after it gets on the top of the piston will usually give good results, as it leaves the piston dry and the soot from the burning charge has no chance to stick to the face of the piston. Should the oil not burn, soot or carbon will accumulate quite rapidly, causing preignition. As to the relative value of oils as found in tests on motors, on one motor which developed 70 horse power using a good grade of lubricating oil, a drop of 10 horse power was noted when using another grade of oil. A good oil is not necessarily high-priced. Oils of an asphalt base usually give the greatest amount of trouble. Three well-fitted rings are sufficient. We usually put a V-shaped groove above the piston-pin, with small holes leading to the piston-pin, to prevent the oil from climbing to the top of the piston.

We preheat the kerosene, having found this gives better economy as well as quicker operation. As to economy: heated kerosene, .80 pound per horsepower-hour; cold kerosene, 1.00 pound per horsepower-hour. Tests were made on the same engine, shutting off the heat, but using hot water from the cylinder jacket in the water jet. From a temperature in the inlet manifold with the heated kerosene ranging from 110 to 120 degrees Fahrenheit, using cold kerosene a drop of 70 to 80 degrees Fahrenheit was noted.

### Discussion

After the paper was read the following questions and answers were asked and made:

Q. How about adding pure air at the end of the suction stroke?

A. If we did not have a great many engines in the field, and were to design especially to burn kerosene, we no doubt would work along that line.

CHAIRMAN. The problem is not one of burning kerosene in a specially designed engine. In view of the fuel problem, our object here is to elicit as much information as we possibly can to enable us to overcome the difficulties of the present situation.

Q. In operating an engine where is the point at which to switch from gasoline to kerosene? Is it a question of temperature?

A. Yes, if economy is to be considered. If not, it will take only a few seconds to make the change, although we usually allow the bowl to get hot, which takes a minute or two before changing from gasoline to kerosene. The temperature of the gases going into the manifold is from 110 to 120 degrees. This, of course, is when operating on kerosene. We find these temperatures about right for the best operation and do not care to have them higher.

### Cold Air and Heated Fuel

We have noted in various tests that heating both air and fuel causes loss of power and preignition. Heated air and cold fuel give slightly better results. Cold air and heated fuel give maximum power and the best economy. With cold fuel and cold air

\*Extract of paper read by A. C. Bennett before the metropolitan section of the S. A. E.



the consumption is very high. The tests were all made on motors having long manifolds, as on two-cylinder opposed and four-cylinder vertical.

When we shall be able to break kerosene up so that the economy equals that of gasoline, there will be no more carbonization than with gasoline.

Acceleration may be very slightly slower with kerosene than with gasoline, but not enough to make any perceptible difference.

Ignition plays a very great part in operating successfully on kerosene. The best high-tension magnetos give the best results. We sometimes have difficulty with the best ignition, but this may be attributed to the manifold or the location of the spark-plug.

#### Water and Combustion

Q. Do you use water only in order to prevent preignition? If you could get along without using it would you get as good combustion?

A. We prefer to use as little water as possible; none if we can. Our economy is always better where no water is used; necessarily combustion must be more perfect without the use of water.

Q. How about carbon in the exhaust? Would it be increased or decreased?

A. The amount of carbon in the exhaust may be due in a measure to the lubricating oil used. If the oil burns only partially, a portion of the carbon will collect in the gummy oil and not be discharged in the exhaust; whereas if the oil burns fully there may appear to be more carbon in the exhaust. Frankly, I do not see that water is of any benefit with respect to the amount of carbon residue when we burn the fuel at best economy. When we shall be able to burn kerosene pound for pound with gasoline, I believe we will be able to eliminate the use of water entirely.

#### Carbonization

Q. Assuming that you use an oil that does burn, would you get carbonization if you did not use water?

A. No, we would not get any more carbon without the use of water. In fact, our tests show we run just as cleanly without water.

Q. Do you usually find so-called 48-gravity kerosene to be really 48-gravity kerosene?

A. We find some that does test 48 gravity, but not commonly. That we are getting in the West tests 42½.

CHAIRMAN. Is there much difference in the use of kerosene as compared with gasoline in a motor truck engine on a cold day after the truck has stood for some time?

A. I think we will be able to operate on kerosene at a very low temperature. The chances are that in very cold weather there will be some condensation in the manifold which will interfere with good operation.

CHAIRMAN. The question was: Is there any great difference between kerosene and gasoline?

A. Not with 48-gravity kerosene, but 42-gravity is a little more sensitive and troublesome to handle.

Q. I would like to know what the wholesale price of kerosene is?

A. I will have to let the oil men answer that question as the prices are constantly rising, different amounts in different localities.

Q. Would you say that with a lubricant that would give good results with gasoline there would be no more formation of carbon with kerosene?

A. The results would be the same. A poor grade of oil used with gasoline will cause formation of carbon quite as easily as with kerosene. If the oil is good with gasoline, it will usually give best results with kerosene.

Q. Why is it that kerosene has received such a blackeye regarding the formation of carbon?

A. Lubricating oil has been sadly neglected by most of the experimenters, judging from the results I have seen. If more care be exercised I am sure that the cause of kerosene will be forwarded. I have seen an engine that after four months' operation of kerosene did not show enough carbon on the pistons to cover the tool marks.

#### Kerosene Combustion Temperature

Q. Why is the temperature higher in burning kerosene?

A. As kerosene has more B. T. U. to the pint than gasoline, and we use more kerosene to develop the same horsepower, we take through the engine a greater number of heat units during a given length of time. The more perfect the mixture, the less the heat; the more thoroughly we can break up the mixture, the better the economy.

CHAIRMAN. Have you experienced any difficulty from collection of the deposits of carbon in the inlet passages?

A. Yes, with poor lubricating oil, but not in the main inlet manifold or under the inlet valve.

CHAIRMAN. Where the kerosene is not broken up and collects in globules and gets down past the pistons, what is the effect on carbonization?

A. If the lubricating oil were not suitable, it would be of assistance; while if the lubricating oil were not gummy, it would make it very thin and be a detriment. So far as carbon deposit is concerned, it would probably assist in washing some of it down into the crank case.

#### Inlet Manifold Temperature

Q. I would like to ask the speaker if he has had any experience in heating the intake pipe after the fuel has been gasified? Will that prevent the kerosene from condensing?

A. If the gas velocity be very low it is necessary to use from 200 to 300 degrees of heat to keep the gases from condensing in the manifold. We find it better to keep the velocity as high as possible, without loss of power. The heat of the liquid fuel and of the water which is injected into the charge assists in keeping the temperature of the manifold about right, from 110 to 120 degrees Fahrenheit.

Q. There has been a gradual tendency to heat the manifold.

A. That is because the manifolds are too large in diameter. It is better to take in a cold charge at high velocity and retard the opening of the inlet valve, obviating jacketing the manifold. We find a slight loss in power where much heat is used in the manifold jacket.

Q. Instead of putting fins in the manifold, would it not be better to put in wire of some suitable shape?

A. Some devices of that kind are giving very good results.

#### Heating the Carburetor

CHAIRMAN. In the system you employ is there any danger of heating the carburetor to too high a temperature?

A. We have not found it so. If the liquid be heated to too high a temperature before it enters the bowl of the carburetor there would be some difficulty. We heat the fuel after it enters the bowl.

Q. Should the carburetors be located close to the entrance point of the vapor into the cylinder?

A. We prefer to have the carburetor as close as possible. A short manifold is always the best.

Q. What is the minimum suction pressure you can run with?

A. With gasoline, about 2 ounces; with kerosene, slightly more; that is, pressure in the carburetor.

CHAIRMAN. What is the maximum velocity at which you prefer to work?

A. We prefer to work with just as high a velocity as possible and develop the maximum power. I cannot specify in feet per second, but believe it is much higher than is common in automobile engines.

CHAIRMAN. At what temperature do you find you get the best efficiencies?

A. We aim to keep the bowl at 300° F. as nearly as possible. The manifold will get slightly warmer than 100 degrees to 120 degrees Fahrenheit.

Q. I assume you heat the kerosene as much as you can at the nozzle or jets?

A. Yes, as much as we can and not have vaporization in the bowl.

CHAIRMAN. I refer Mr. Ashley to the Proceedings of the Institution of Automobile Engineers, session of 1911 and 1912, page 270, where he will find a very able exposition of the use of kerosene, giving data of a series of tests.

#### Conclusion

Q. In 1901 I ran a double-cylinder 6¼ by 6½ in. marine engine from Poughkeepsie, N. Y., to Bridgeport, Conn., using a 1¼ inch Lunkenheimer vaporizer. The only change necessary was to give it considerably less air and to be careful that the engine did not throttle down. The cylinder heads were running very hot. The ignition was make-and-break, and the compression, as I remember it, 80 pounds gage. There was very little sooting of the cylinder heads or valves. The engine behaved very well as long as the throttle was wide open, but there was no flexibility. Since that time I have had more or less experience with kerosene carburetors and kerosene engines. I am a good listener but personally I have no faith in the kerosene carburetor. As long as we have any gasoline whatever to mix with kerosene, give me the mixture, not raw kerosene.

A. Gasoline and kerosene mixed one-to-five do very nicely if properly carbureted. I think Mr. Potter is perfectly right as to pleasure car operation. I do not think there is any question about that. But for heavy-duty work kerosene is giving very nice results every day.

CHAIRMAN. You use a little more kerosene per horsepower-hour, but at a smaller expense. Do you vaporize the kerosene or pulverize it very finely?

A. Pulverize or atomize it. In other words, the function of evaporation which we have with gasoline in the carburetor is absent in the kerosene carburetor. In the kerosene carburetor we must depend upon mechanical distribution to get uniform action.

## Keep the Cars Moving!

BY NORMAN MAUL



IN the observance of that peremptory order lies one of the biggest problems of rail transportation.

A tie-up, however brief, is indeed a serious proposition, and there is little wonder at the precautions the road takes to protect itself against such misfortune. Let a crowded car be delayed more than a minute some one will poke his head out the window to see what is wrong. By the time two minutes have passed some one will get out and walk, while Mr. Citizen Fixit will tell the motorman and conductor just what to do.

It is at this time though that the emergency organization of the company begins to show itself, for the car crew has that order "Keep the cars moving" ever in mind. If the delay is caused by an obstruction that may not be readily removed, if there has been an accident to the running gear of the car, or if the track equipment is out of order, a telephone message is sent to headquarters. This is usually done by an inspector, for these watchmen of the roads traffic are stationed within easy reach of any point where there might be congestion or accident. If, however, there is no inspector in sight, the conductor acts. A typical instance is the best explanation of the methods of the company.

During the subway excavation at Broadway and Grand street, a horse fell in a street opening, and in less than five minutes had a line of cars stalled in all directions. The call at once went to the office of the company, with a description of the accident and its location. Yet almost before the inspector had finished his explanation the telephone operator had the downtown emergency crew on another wire, and before the first caller had finished the wagon was on its way. It was a matter of but very few minutes to rig up a temporary derrick and hoist the horse from the hole and restore traffic to normal conditions.



Courtesy of New York Edison Company

### Couple Gear Tricar, Used by Railway

A newcomer in the automobile field. This three-wheeled electric cart was hauled by a team of horses before the motor wheel and storage battery were added. It is used for hauling coal, ashes and the dirt that accumulates in the car slot.

The reason for the speed and dispatch with which this emergency service operates is due entirely to the electric vehicle equipment which displaced the horses two years ago. These emergency wagons cover the entire territory of the company. One is stationed at 129th street and Amsterdam avenue, and is within easy reach of the northern limits of the



Courtesy of New York Edison Company

### A Couple Gear Front-Drive Car

In the everyday work of railroading, this three-ton truck is kept constantly busy hauling all sorts of heavy material. Note the bumper in front, used to push disabled street cars or other vehicles obstructing traffic.

system; another is at 65th street and Third avenue, covering the central district; the third is at Grand street and the Bowery, and covers all the southern territory, while the fourth is held in reserve, to be sent to the points where congestion is heaviest at the different seasons.

Street accidents occur on an average of about four times a day, and the wagons in responding, have the same right of way that is accorded the fire engine or a hospital ambulance. A clanging bell, just like that of the fire apparatus, warns of its approach. Their work done, they return to the station at almost the same speed, and this is one of the features in which they demonstrate their superiority over the horses they displaced. They return at top speed, and are at once ready for a second call, whereas the horses had to be walked back, in order to rest after their mad gallop to the accident.

Although these wagons are called out so frequently, it is seldom they are called upon to repair damages to the road's equipment, almost all of the delays being due to breakdowns of the horse-drawn vehicles that occupy the tracks. A month's report of these accidents shows case after case in which horses have fallen, others show that wagons have broken down, and occasionally there is the report of a burned out circuit or a deranged switch. No matter what the trouble is, though, the men who man these emergency wagons, are prepared to straighten out the difficulty, and it is yet to be recorded that they, or their wagons have fallen down on any call.

It has been shown that they respond at greater speed and return to the station faster than the horses. It is also a fact,

and of almost as great importance, that the cost of maintenance is 75 per cent. less than that of the horse equipment. This is because in the old days the company employed, in addition to the emergency men, hostlers and drivers, who did nothing but care for the animals, and that in addition to the stable room required, each wagon needed four horses, so that on the days one team rested the other could take the calls.

The emergency wagons were installed in May, 1911.



**Third Avenue Emergency Car**

Four wagons like this displaced a like number of horse-drawn vehicles, sixteen animals and all the stable help that was required in the old days. They handle all the emergencies on a street railway system of fifty miles.

They were built by the General Vehicle Company, on the standard two-ton chassis, the open body being designed to accommodate a complete kit of emergency tools. The wagon, in appearance, is more like a hose cart of the fire department service than anything else, except that in place of the hose lengths and scaling ladders, are block and tackle, rope, cables, lanterns, jacks, motor-driven tools, track sections and pumps. In fact, the wagon is equipped with tools with which almost any kind of a blockade could be lifted.

There are a number of other electric trucks for the more prosaic work of railroading. One of these is a one-ton machine for light hauling of all kinds, another is a three-ton truck, formerly drawn by horses, that was converted by the addition of two couple gear freight wheels and a storage battery, and the most recent addition to the equipment is a three-wheeled dump cart, that was placed in service last Fall. This three-wheeler is also a conversion, the shafts that were formerly occupied by a team of horses having been removed and their place taken by a single Couple Gear wheel, mounted under a steel frame. This frame runs the length of the cart from the single axle to a point about four feet in front of the driver's seat, and acts as a support for the battery box. Directly under the seat, and easily accessible, is the electrical apparatus. There is a saving of eight feet in the over-all length of this three-wheeler as compared with the same cart and its horses. It not only serves as a coal and ash cart, but is used for the removal of the dirt which collects along the railroad track.



**Nest Bodies Increase Delivery Efficiency**

Frederick & Nelson, furniture dealers in Seattle, have greatly increased the efficiency of their GMC delivery truck by the employment of "nest bodies," the use of which is here shown. While the truck is running about the city, making deliveries, the extra "nest" body is loaded and transferred to a small hand pick-up truck. When the motor truck returns to the store the "nest" body is immediately pushed into place and without any lost time the truck again starts out on another route. By this method, costly waits at the loading platforms are eliminated and the truck is run at its maximum working efficiency.





## Notes on European Practice of the Use of Steel Wheels

BY OUR FOREIGN CORRESPONDENT

**T**HE commercial automobile in Europe has been largely influenced by the development of the motor 'bus in London in conjunction with economic conditions governing the supply of suitable timber for wheels. Indeed, these two factors have had more to do than anything else with the employment of steel wheels for heavy cars.

Taking the motor 'bus influence first, it must be remembered that the development of the auto 'bus proposition in London was extremely rapid. No data was available either for the specialized design of heavy cars or for their working, yet the omnibuses were put on the streets in hundreds. Moreover, the weight limit then was put at five tons with body empty. Result—popular outcry almost drowned the noise of the vehicles. Generally these cars had massive wooden wheels, adding to the weight and sometimes contributing by creaking to the general noise. Then in August, 1909, came the restriction to a 3½-ton unladen weight limit and the necessity for cutting down weight to a fine point that rendered wood wheels nearly impossible, apart from any question of noise.

These facts have had a big influence on commercial car design, not only because of the market that the big London 'bus companies have offered in the past (they mostly make their own machines now), but also because the London motor 'buses, representing, as they do, the biggest aggregate experience in working, are closely studied over here and in general their practice is followed by manufacturers.

### Cast-Steel Wheel Designs

But the steel wheel is no new thing. Almost from the first it has been with us, though generally in its earlier form it took the shape of a composite wheel of wood and steel. The Rowcliffe wheel, made by the Atlas Engineering Company, was a good example, in which felloes and spokes were in one single casting with the nave, which last was made in the shape of a hollow annular cup, into which a ring of hard wood was forced with a view of deadening vibration at the centre. Where steel tires are used this composite construction is still



Sheffield Electric Steel Castings Company's Tubular-Spoked Steel Wheels



Solid-Spoked Steel Wheel, With Rubber Tires

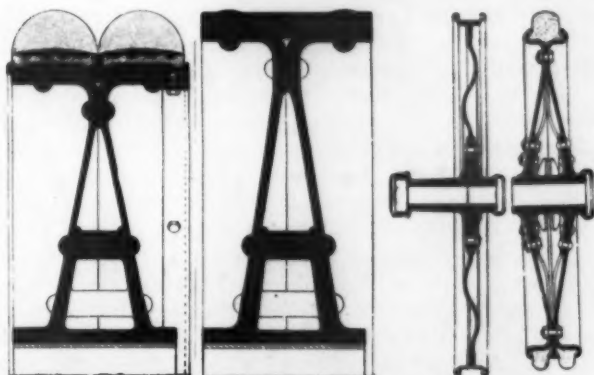
maintained by the Atlas Resilient Road Wheel Company, upon whom the mantle of the other firm has fallen, but in these the hardwood is generally introduced at the felloe. The wheel most generally in demand at the present day is an all steel wheel for use with rubber tires, and shows some tubular spoked steel wheels made for motor omnibus work. Yet, though these are perhaps more easily kept clean and may look neater, in strength and durability they certainly offer no advantage over a spoke of cross section, and at present many of the leading manufacturers of commercial vehicles are in favor of such a section with Y-shaped spokes, which afford a greater number of supports to the wheel rim without increasing the weight, and enabling the driving stresses and road shocks to be more equally distributed over the whole wheel.

In France, too, steel wheels are coming into use very rapidly, and a good many of the machines in the military trials were fitted with them. On this matter I was in touch with Fonderie de Suresnes, H. Cazalou, who furnished the wheels for the Peugeot trucks, among others. They use a hollow spoked design, and for the purpose employ a very soft wheel, which runs so easily in the mould that they have no difficulty in ensuring a spoked wheel ranging between 8 and 9 millimetres in thickness.

The hollow spoked design, too, is favored by the Sheffield Electric Steel Castings Company, Ltd. For this they use a steel of 33 tons tensile strength to the square inch, with an elongation of 20 per cent. in 8 in. This metal, which is of an exceedingly high quality, produced in the electric furnace, can be bent cold through an angle of 108 degrees. Some of these are cast with plain flat rims, others with hollow rims.

### Built-Up Plate Steel Wheels

For a good many years built-up steel wheels have been used chiefly for steam wagons running on steel tires, but the

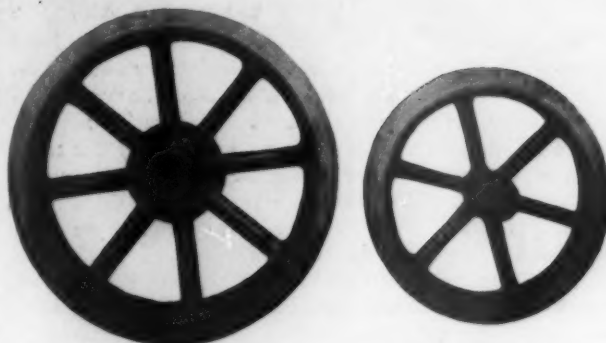


**Built-Up Plate Steel Wheel, for Light and Heavy Vehicles; Are Fitted With Steel, or Single or Dual Solid Tires**

type is now finding wider application, and is being used with rubber tires.

A firm near Newcastle-on-Tyne, T. Toward & Company, Ltd., have specialized very strongly on this type, which, however, embody important improvements on the usual built-up steel wheel, for in the latter, the rim of the wheel is usually made up of T-section steel, to the web of which the spokes, cut from mild plate steel, are riveted at their outer ends. But the Toward wheel is constructed of two dished and flanged circular plates forming the rims and spokes in one piece, and thus obviating riveting the rims and the risk of the rivets becoming loose. These plates are thickened at the flanges, and also at the centre, during the process of manufacture; they are then bored out in the centre to fit the shoulder on the hub, which is of toughened annealed cast steel, and the plates are placed back to back. The one plate is formed with a slight shoulder, fitting into a recess on the other plate, and this is a very important factor in keeping all rivets tight. When the two plates have been placed back to back, the joint between them at the rim is faced with a spigot, and the trod plates of hardened high carbon steel are riveted to complete construction.

Other types that this firm are turning out for lighter work is the embossed steel disc wheel for comparatively light motor vehicles. They are claimed to have considerable lateral strength, and, of course, are very easy to keep clean, while they obviate the disadvantage of spokes, and are absolutely free from shrinking. The steel used in the manufacture of these wheels is high quality Siemens-Martin steel.

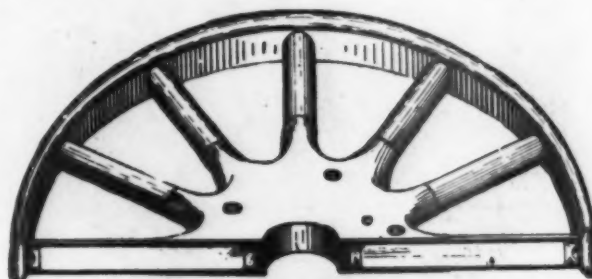


**Tubular-Spoked Steel Wheels, Mounted With Rubber Tires**

### The Pressed-Steel Wheels

One type of wheel that is coming very largely into use on private cars in Europe is the Sankey pressed steel wheel. In appearance this is almost identical with the wooden artillery wheel, except that the spokes join the felloe and nave with a nice curvature. These wheels are made of pressed steel in two halves, each being pressed to the exact shape of the outer or inner face of the wheel, as the case may be. The halves are then put together and are oxy-acetylene welded all along the joint. These wheels are very light and strong; possibly they might be even stronger were a box-section of spoke employed instead of the ordinary elliptical artillery section that is at present generally followed. One of them, the smallest size made for cycle car work, weighed by the writer, was less than 9½ lbs. in weight.

Another steel wheel, somewhat similar in appearance, but very different in principle, is that bearing the name of its maker—L. A. S. T. Wheels, Ltd. In this the spokes are tubular, of elliptical section, each anchored in position at its outer end by being forced over a pressed steel cup riveted to the rim, while at the hub end, after the spoke has been shaped to the curvature of the nave ring and reinforced, the manufacturing arrangements insure a ring of the exactly correct diameter, to afford a given compression, being forced into the centre, which is then covered in by stamped steel sheet centers placed together on opposite sides and welded. Great importance is attached to the spokes of the wheel being under great compression, on a similar principle to that observed in shrinking on the tire of a wooden wheel, thus holding all parts together and eliminating possible shake and working loose. In this method of construction the only welding required is that of joining the two centre plates together. At present this is done by oxy-acetylene, but it is intended to do it electrically in the future, and the makers of this wheel are further extending the welding idea so that the spokes shall be welded to the rim.



**The Compression-Spoked Steel Wheel, With Elliptical-Section Spokes Anchored to the Rim**

## THE MOTOR TRAFFIC OF LONDON

In no city of the world has the motor omnibus found greater favor than in London, and this is probably owing to the peculiar traffic conditions, for, being the gradual growth of fifteen hundred years or more, the British capital has not been laid out exactly on modern lines, with the result that traffic congestion along the main routes in the centre of the metropolis is so acute, and the streets are so narrow that tramways would be impossible. Nevertheless, the success of the motor omnibus has frightened the tramway interests, and as the County Council or Local Government authorities are considerably interested in the tramways, there is a tendency to confuse the issue, and to judge the motor omnibus and the tram on the political expedience of municipal parties rather than on their own intrinsic merit.

Those who wish for a calm and unbiased statement of the case will, therefore, welcome the report published by the Traffic Branch of the Board of Trade, for this merely gives plain statement of facts and figures without expression of opinion, and in these facts and figures there is a good deal of interest, more especially as showing the growth of automobile transport. In this case, the following selected quotations may therefore be allowed to speak for themselves:

"The total number of licensed motor omnibuses in London in July, 1912, was 2,085, compared with 1,550 in July, 1911, showing an increase of 535, or 34 per cent. Of these, 1,909 omnibuses are petrol-driven, 131 are steam driven, and 45 worked on the petrol-electric system. Of this number it may be assumed that approximately 90 per cent., or 1,876, were in daily operation.

"The number of passengers carried by omnibuses in London during the year ending September 30, 1911, was 400,628,487, an increase of 23,420,932 over the previous year. The table shows the steady increase in the number of omnibus passengers during the past three years:"

Year ending September 30, 1909 .....	*311,000,000
Year ending September 30, 1910 .....	377,207,555
Year ending September 30, 1911 .....	400,628,487

"The motor omnibus 'rush' hour service is very little greater than their service during 'normal' hours, whereas the electric railways following the same routes find it profitable practically to double their seating capacity during the 'rush' hours.

"The average earnings per omnibus mile, which may be taken as 10½d. all over London, are well maintained, notwithstanding the increase in the number of omnibuses running.

\*Estimated on basis of receipts and believed to be underestimated.

"Working expenses have again been reduced during the past year, and now average, in the case of large companies, rather less than 8d. per omnibus mile against 8¼d. in 1911, and further reductions in running costs are to be expected as improvements continue. A wide field is still open for invention. For instance, the successful substitution of paraffin for petrol could itself effect a further considerable reduction."

It may be as well for the writer to add unofficially, that at the present time the cost of working the 34-seated motor omnibuses in London (vehicles equivalent in size and weight to a three-ton truck) averages about 7½d. (15 cents) a mile.

## A BRITISH AUTOMOBILE STREET SWEEPER

Hitherto comparatively little attention has been given to motor machines, as distinct from motor transport, for municipal work. In some cities wagons are extensively used, but Europe has let it chiefly to France to devote attention to the power driven street sweeper.

A British firm, however, The Lacre Motor Car Company, Ltd., has just produced a standard machine of this type with an 18 h. p. 2-cylinder engine driven by side chain through a transmission giving speeds of 4, 8 and 13 miles an hour. As the best working speed for sweeping is about 7 miles an hour, the second set of gears come in for a good deal of work, while for light sweeping on moist roads 10 to 12 miles an hour can easily be obtained. The brush is 5 ft. long and 18 in. in diameter, and driven through a sprocket shaft by means of a dog clutch engaging with the sprocket wheel, and operated by a lever placed to the left of the driver. The brush, too, is raised and lowered by lever, to the left of the driver's seat, and controlled by an adjustable balance weight on the off side of the vehicle. An important feature of this road sweeper is in the brackets on each side of the brush shaft, allowing for adjustment and equalized wearing of the brush. Finally, a feature of the design is the large diameter of the wheels—40 in. at the front and 48 in. at the rear.

At the forthcoming commercial car exhibition in London during July, it is proposed to hold an Imperial Motor Transport Conference, under the presidency of Prince Arthur, of Connaught, the idea being for Government departments and those interested in commercial car development throughout the British Empire to be represented. The Hon. Arthur Stanley, M. P., Chairman of the Royal Automobile Club, is Chairman of the Executive Committee of the Conference, and H. M. Wyatt the honorary secretary.



**British Motor-Driven Street Sweeper**

The left and right sides of the Lacre motor-driven sweeper are here shown, which make clear the manner in which the rear wheels, and also the sweeper, are driven



## How the Commercial Car is Assisting Contractors

(Continued from page 32)

trucks in this service and seven new trucks are on order. These machines each do the work of four and one-half teams, and have kept up this pace since they started last April. The owners feel assured from the study which they have made of truck conditions that the vehicles will operate satisfactorily all winter. At the present time they are saving considerable money hauling road material such as Port Deposit granite, Peekskill gravel and trap rock for the Park commissioners. They are operating ten hours per day.

### A Comparison of Costs

Horses at the best were able to do not over three trips of two yards each, or six yards per day, while the trucks over the same ground make eight trips of five yards each, or forty yards in the same length of time. Teams for this work can be hired at the rate of \$6 per day, while a truck costs \$15 per day, including every item of expense. The depreciation is figured in an unusual way, \$1000 being figured for the first year, and after that the amount is determined by the condition of the truck at subsequent periods, and what it would bring second hand. These figures include insurance, such as accident, fire and collision, interest, wages, tires, repairs, gasoline, oil and storage. It is therefore seen that the costs compare as follows:

	Trips	Load, cu. yds.	Cu. yds. hauled per day	Cost per day	Cost per yd.
Horses .....	3	2	6	\$6.00	\$1.00
Trucks .....	8	5	40	15.00	.37

Saving 63 cents per cu. yd., which at the rate of 40 yds. per day per truck is a saving of \$24.20 per day for each truck.

### Horse Drivers Become Chauffeurs

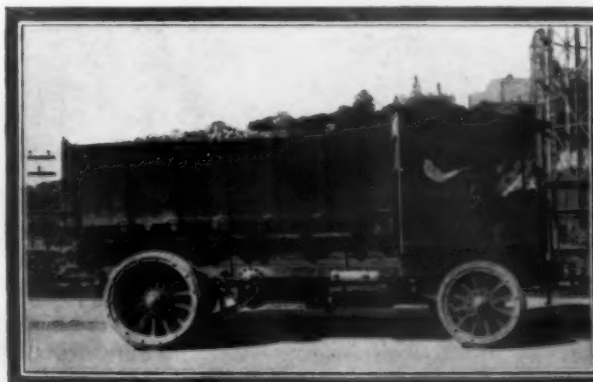
The Watson Company does not believe in employing regular chauffeurs, but insists on placing on the machines horse drivers who have shown their ability to handle a motor vehicle. "The ordinary chauffeur does not want to work," was the statement made, and he will not handle the terra cotta, tile, brick, etc., which constitute the loads carried. Furthermore, regular drivers do not understand the teaming business. These men are paid from \$2.25 to \$3.00 per day up to \$20 per week. They work ten hours, and do not receive any

overtime. They do not care for the machines, however, after reaching the garage.

The trucks are fitted with dumping bodies of the kind which are hand cranked to the balancing point at the rear, and then discharge their load by gravity. When asked concerning the jar due to the body hitting the ground, it was said that this was not severe, but was sufficient to loosen the wet sand so that it discharged completely, and that with the ordinary type of dumping body the sand adhered and was very difficult to remove.

### Would Pay if Cost as Much as Horses

When questioned by the "C. C. J." man as to the satisfaction which was being derived from the use of trucks, the statement was made that if the trucks cost just as much as horses they would be a great advantage to the company, owing to a peculiar condition which usually exists. It is impossible to use horses, or in fact any kind of vehicles during a good part of the winter season, as the quarries from which material is obtained have a habit of shutting down in December, or at the very first snow, to fix up their machinery. It costs the construction company about \$6,665 to feed the horses during the winter, or they must be sold at a loss of almost the same amount. New horses must then be purchased in the spring, and these are usually green and do not turn out the work. They must be broken in before they become efficient. Even if the horses are held over, they are often subject to glanders from being overfed during the winter when not working, and are also attacked by spinal meningitis. On the other hand trucks are purchased and charged to the job. If they are retained they are no particular expense during the winter if not used, while the horses cost a small fortune to feed during the inoperative period. If anything serious happens to a horse it has to be shot and is a total loss, while if anything goes wrong with a truck, a new wheel or part can be replaced. Up to the present time the trucks have shown a decided saving, and do considerably more work than the horses. During the fall, when the ground is apt to be slippery, continual trouble with the horses is had as the wagons load at Fordham Dock, and have to negotiate a very steep hill to get up to the main street. The S. P. C. A. is after the com-



Contractor's Trucks on Aqueduct Work

One of the Watson Contracting Company's Garfords is shown at the left, which is saving sixty-three cents per cubic yard, hauling forty yards a day, making a saving of \$25.20 per day on each truck. At the right is a truck with a trailer, each carrying a six-ton removable metal-hopper body, that on the truck about to be lifted by the electrically operated derrick for dumping.



#### Garfords Used by the Pittsburgh Contracting Company

At the left is shown a Garford with Shadbolt roller dumping body, which delivers its load by gravity. In the other view is shown a truck being loaded with three-inch planks with which to construct the corduroy road on the dump, giving a satisfactory foundation for the trucks to operate upon

pany to sand the hill, and if they do sand it the Bridge Department which controls the road makes a fuss about it. The trucks so far have been able to climb the hill successfully.

In an accompanying illustration one of these machines is shown being loaded with terra cotta from a boat. They are not usually employed for this work, as it takes too long to load by hand, but in the case shown, part of the load was to go but a short distance, and the rest to go many miles out, and as the shipper was willing to stand the expense, the truck was used.

#### Special Garage and Stable

A large building, some 62½ x 230 ft. is employed as a stable and garage. Here are kept all the trucks and wagons, and on the downstairs floor some 100 horses. The trucks drive in from the street on one side of the building where the second floor is on a level with the street. Three wheelwrights and a blacksmith do the necessary repairing. Owing to the fact that many of the drivers are in and around the building over night, the fire risk is rather great, so that the machines are insured. The accident, fire and collision risks amount to about \$370 per truck. For the same reason no gasoline can be kept in the building, the only available place being too close to the blacksmith shop. As over 650 to 700 gallons per week are used, and paid for at the rate of 18 cents per gallon at the time of this writing, it will be seen that these items of expense are not kept down as low as might be by making other arrangements.

Tire troubles have been more prominent than anything else, but as the tires are guaranteed for 10,000 miles, whenever the tires have given out the companies have willingly replaced them. Owing to the use of demountable rims which were not entirely perfected for this heavy work, two tires were ruined at 1400 and 1600 miles respectively. This was due to the wheel turning within the rim, it being impossible to clamp the rim sufficiently tight to the wheel to prevent this trouble. Since the tires were replaced a new locking device between rim and wheel has been tried, and it is believed will prove successful. The writer noticed that on several machines the flanges of the rims did not protrude far enough to prevent the retaining nuts from striking curbstones, and in one or two instances the nuts were sheared off. In spite of such minor difficulties the trucks are said to be very satisfactory.

Another New York contracting company is using to great advantage a converted stone wagon which is virtually half

a motor truck, as the front wheels were removed and replaced by two of the Couple Gear Company's electrically driven wheels. A battery box containing 44 cells was placed under the middle of the body, following the usual electric truck practice. This truck was made up after a strenuous test of a Couple Gear four wheeler in which the truck with a trailer easily handled a 15-ton load on a stiff grade. This combination vehicle is shown in an accompanying illustration, being derrick loaded with rock. It often carries as high as 6 tons, although rated as a 5-ton truck.

On a short haul, this truck carries three of these huge derrick stones, making twelve trips against the horses carrying two stones, and only making eight trips, the total work of the truck being equivalent to a pair of two-horse teams. This vehicle has shown a saving of about \$1500 a year of 300 working days.

#### TRUCK USED BY THE JOPLIN TRANSFER COMPANY, HAULS DRAFT ANIMALS

The Joplin Transfer Company, of Joplin, Mo., has found a novel way of using a truck and a team of horses in a sort of return combination. The firm bought a 1-ton Mack truck and fitted it with a furniture body. On long hauls the team and



#### The Joplin Company's Mack Truck as Stock Car

wagon are loaded and given a good start. Then the truck is loaded and reaches the destination about the same time. After unloading both vehicles, the team is marched solemnly up into the body of the truck, the wagon is hitched behind, and the whole affair goes bowling merrily back again. The plan has been tried to points as distant as Pittsburgh, Kans., with great success.

# Service

## That Counts With Truck Owners



**T**HE Firestone trade-mark on truck tires stands not only for supremacy of *actual road service, economy, security and extra mileage*; but for supremacy of agency service as well.

Truck owners can now get Firestone truck tires which will fill their delivery needs, and get them at a *moment's notice*. They can secure *immediate attention and aid*, no matter how slight or how great the necessity, with little or no loss of time for man or truck.

Your heavy service truck will pay biggest dividends when equipped with these tires. Prevent traction wave—increase economy of tire service—reduce truck expense—prevent skid—reduce gasoline consumption.

Firestone Tire economy and mileage were proved long ago. Call at the nearest of our many Special Service Stations; see for yourself how we are equipped to take care of you without delay. Write for catalogue.

**The Firestone Tire and Rubber Co.**  
"America's Largest Exclusive Tire and Rim Makers"  
Akron, Ohio      All Large Cities

**The  
Tire  
That  
Lasts**

# Firestone



## Commercial Cars Solving the Difficult Question of Rapid Food Transportation

(Continued from page 22)

amount of gas used, oil, miles covered, and the repairs, if any, are put on the same report by the repair man. At first the cars were fitted with distance recording instruments, but as the machines covered definite routes, the mileage of which is



**The First Alco Being Overhauled**

This truck has covered 50,000 miles, being operated by two and three shifts of men. Note the radiator protector forming the word "Hood"

almost exactly known, this was found to be unnecessary. The substance of these reports is kept on two permanent records, so that the exact work of each truck is known.

### Drivers

The drivers are old horsemen, who have been in service for a long time, and who are familiar with the handling of milk and know the routes. These men are paid more when driving trucks, get to their destination on time, return on time, and are better satisfied. The average wage received by the drivers is \$18 per week.

When asked if his men were satisfactory operators of trucks, Mr. Farnsworth said, "the business is more important than driving. We might perhaps get more expert drivers, but the business would probably suffer, and for this reason old horse drivers are more satisfactory. The drivers help load

when they can. They have the strictest instructions to attend to the minor oiling and the screwing up of grease cups, etc., and these matters are given attention at set times, just as in railroad practice."

The work of the trucks is divided according to their suitability. No. 7, which is an Autocar, which has been in service a year, takes care of the 17 Boston stores, delivering to them from the Hood headquarters, on Commercial Street, Boston. No. 4, also an Autocar, attends to hurry-up calls for hotels, drug stores, and special orders for milk. The Autocars average about five gallons of gasoline a day, covering a distance of approximately 40 miles.

### Autocars on Pneumatics

Pneumatic tires are now used on all the Autocars, Mr. Farnsworth believing that this pays. A great deal of the work is over cobblestone pavements, and he found that the use of pneumatics reduced the repair bills and minor breakages sufficiently to warrant their use. Not only are pneumatic tires used, but over-sized tires are employed, and as the first delivery reduces the load considerably, these machines, are, as a rule under—never overloaded, which, together with the over-sized tires, is accountable for the very successful service obtained.

Four of these cars have handled regularly 80 tons of milk every 24 hours. Their average mileage totals only 180 miles, as some of the cars are on short hauls.

The Chase cars are used for deliveries in outlying districts on dirt roads, and are fitted with solid tires. One of these is located in Lynn, another in Forest Hills. They take care also of special deliveries, and rush orders for small quantities, such as 50 quarts, and are generally used to fill in with.

A converted Kissel Kar is also employed as a repair and hurry-up wagon, so that in emergencies this machine is used to carry parts and men to a disabled truck. The drivers, although familiar with the trucks, are not allowed to make carburetor or other adjustments, and are simply supposed to look after the oiling and operating.

**Daily Record Sheets**



## The Final Choice of the Discriminating Purchaser

After trying out several different types of motor trucks for the past two years, The Atlantic Ice and Coal Corporation, of Atlanta, Georgia, has recently ordered fifteen White Trucks for immediate delivery.

Responsible firms prefer to purchase truck equipment from responsible manufacturers. This is one of the reasons why the final choice of the discriminating purchaser is invariably White.

Another point of importance is the fact that White Owners continue to buy White Trucks. When Whites are used, experimentation ceases.

White Trucks are the most economical trucks to operate.

  
**THE WHITE COMPANY**  
CLEVELAND

*Manufacturers of Gasoline Motor Cars, Trucks and Taxicabs*

### Operation Records

In the accompanying table, which is a monthly report for these cars, is shown the months of January and February, 1913:

#### Automobile Report for January, 1913

Car	Days Run	Miles	Gas	Oil	Tires	Repairs	Parts
1	Idle.	Emergency Wagon					
2	21½	713	270½	30½	0.00	\$81.20	\$12.50
3	17	965	539	14¾	154.76	137.10	43.86
4	28	1433	161	9¾	0.00	0.00	197.02
5	9	669	151	11¾ 1 pt.	0.00	134.50	13.15
6	24	960	119½	5¾	0.00	22.70	17.50
7	29	1181	131	10½ 1 pt.	131.90	2.80	36.61
11	28	1618	885	36½	0.00	261.24	12.50
12	4	209	75	5½	0.00	0.00	108.70

2132 125 1 qt. \$286.66 \$639.54 \$446.84

Cost of Oil .....	\$50.10
Cost of Gas .....	362.44
Cost of Tires .....	286.66
Cost of Repairs .....	639.54
Cost of Parts .....	446.84

Total Cost .....\$1785.58

#### Automobile Report for February, 1913

Car	Days Run	Miles	Gas	Oil	Tires	Repairs	Parts
1	Emergency Wagon						
2	26	967	251	23¾	\$00.00	\$15.60	\$66.59
3	26	1480	621	26¾	45.20	40.65	103.00½
4	27	1198	145½	8¾	0.00	.20	.65
5	00	000	000	00	0.00	99.70	67.90¼
6	12	460	53	2 15-16	0.00	29.25	26.52
7	15	608	84½	8¾	0.00	81.25	23.60
11	24	696	396	72	319.25	25.85	50.65
12	28	2031	649	13 13-16	8.80	56.65	104.38

2200 156¼ \$373.25 \$349.15 \$443.29¼

Cars 3, 4 and 7, 5 lbs., 5 lbs. and 10½ lbs. grease, respectively.

Car 12, 2½ gallons of alcohol.

Cost of Gas .....	\$374.00
Cost of Oil .....	63.50
Cost of Grease .....	1.84½
Cost of Alcohol .....	1.02½
Cost of Tires .....	373.25
Cost of Repairs .....	349.15
Cost of Parts .....	443.29¼

Total Cost .....\$1606.06¼

No. 1 car is the Kissel Kar. The small amount of use it received is clearly shown by the report. No. 2 is the oldest Alco; No. 3 is also an Alco; No. 4 is an Autocar; No. 5 is a second-hand Alco, which was put into shape as shown by the repairs, and has been giving satisfactory service. Nos. 6 and 7 are Autocars, which have been in service a year; No. 11 is a Sampson truck, of 5 tons capacity, which was put in service December 25th, 1912. The figures here given cover only two months, but are accurate and typical of the service. Garaging and driver's wages are not included, but the cars are cared for as mentioned before, in the company's own garage. It is noticeable that kerosene is used for all cleaning purposes in the garage instead of gasoline, this being an economy which may well be followed in other places, owing to the extremely high price of gasoline.

### Four Trucks Displacing Fifteen Drivers and Fifty-one Horses

The following is a comparison of the number of horses, wagons and men which would be required to do the work now being done by trucks Nos. 3, 5, 11 and 12. These four cars cover about 200 miles daily, and haul about 50 tons of merchandise.

#### Truck No. 3. Five-Ton

Horses and Wagons to do Same Work

1 Driver  
3 Trips from Forrest Hills  
48 miles  
16½ Tons

Day Work

3 Drivers  
3 Wagons  
9 Horses

1 Driver  
3 Trips, Malden  
24 Miles  
12 Tons

Night Work

2 Drivers  
2 Wagons  
8 Horses

Therefore this truck with 2 drivers does the work of 5 drivers, 5 wagons and 17 horses.

#### Truck No. 5. Three-Ton

1 Driver  
2 Trips  
20 Miles  
6 Tons

1 Driver  
1 Wagon  
2 Horses

#### Truck No. 11. Five-Ton

1½ Drivers  
4 Trips  
40 Miles  
23 Tons

(One man's time  
Half another's time)

4 Drivers  
4 Wagons  
16 Horses

#### Truck No. 12. Three and a Half Ton

1 Driver  
3 Trips  
50 Miles  
11 Tons

Day Work

3 Drivers  
3 Wagons  
6 Horses

1 Driver  
3 Trips  
24 Miles  
12 Tons

Night Work

2 Drivers  
2 Wagons  
8 Horses

This one truck, therefore, displaces 5 drivers and wagons and 14 horses.

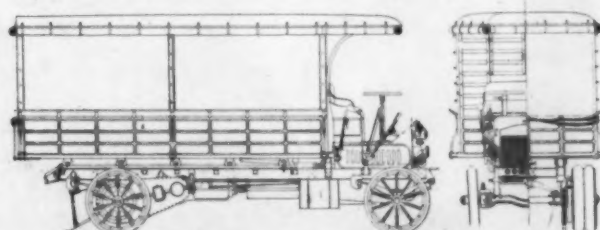
The 4 trucks and 6½ drivers are actually doing the work of 15 drivers and 51 horses.

Mr. Farnsworth reports very favorably on trucks, and reiterates what is usually stated by all experienced users, that it would be out of the question to go back again to the old horse methods.

### DEMONSTRATION PROVES FIVE-TON TRUCK VALUABLE TO GROCERS

In a recent demonstration by the Chicago agency of the Locomobile Company of America, it was clearly shown that a five-ton motor truck will show increased efficiency in deliveries to retail grocery stores, and also that a great saving in time can be accomplished at the loading end by the use of demountable bodies.

The demonstration was made for Reid, Murdock & Company, one of Chicago's largest wholesale grocers. The truck started to load at 7 A. M., and did not get away until 8.56, thus an hour and 56 minutes were required for loading. Twenty-four deliveries or calls were made, consuming 6 hours and 5 minutes, and covering a distance of 17.2 miles by the



Two Views of Locomobile Trucks, With Special Demountable Bodies



# "Use Kerosene as Fuel"

## THE G. C. VAPORIZER

Has been scientifically tested by Mr. Robt. W. A. Brewer, the acknowledged British Carburetor authority. What he learned of its astonishing efficiency and economy ought to interest you.

**ROBERT W. A. BREWER,**  
A. M. I. C. E., M. I. M. E., M. I. A. E., F. S. E.,  
CONSULTING ENGINEER,  
Automobile, Marine and Aeroplane Expert.  
Telegraphic Address: "PLANIVOLAS, LONDON."  
Telephone: GERRARD, 3128.

199 Piccadilly,  
London, W.

3rd June, 1912.

### REPORT

The G. C. Vaporizer, Limited,  
11 Hart Street, W. C.

Dear Sirs:

I have concluded a comparative test between Gasolene and Kerosene Oil, on a 30 H. P. Aster engine, the engine while running on Gasoline being under ordinary conditions, and fitted with a G. C. Vaporizer while running on Kerosene oil, with the following results:

1. The full load consumption in gallons was the same with kerosene as with gasolene, and rather less at partial loads. The improved running at light loads was due to the more perfect carburetion with the G. C. apparatus, as compared with an ordinary high-class gasolene carburetor.
2. Owing to improved carburetion, the heat loss to the cylinder walls is less than in the case of a gasolene carburetor and consequently the engine runs cooler.
3. For the same reason the flexibility and acceleration of the engine are increased.
4. There is no apparent carbon or greasy deposit in the engine as a result of using kerosene in the G. C. apparatus.

I have also run a 28 H. P. Straker-Squire lorry, weighing 3 tons, 12 cwt., to Brighton and back, fitted with a G. C. Vaporizer using kerosene, with the same mileage per gallon of kerosene as can be obtained from a gallon of gasolene in the ordinary gasolene carburetor. The lorry managed 95% of the road in top speed and only 5% in the second gear, proving that full power can be obtained from the engine.

The results of the above tests are clearly of such a satisfactory character that in my opinion there are very great advantages to be derived from the use of the Vaporizer, the cost for fuel being halved; it is easily fitted, has no moving parts to wear out, and requires practically no attention.

(Signed) ROBERT W. A. BREWER.

***The G. C. Vaporizer completely overcomes every vaporizing and lubricating difficulty heretofore encountered in using kerosene. We absolutely guarantee its perfect service.***

Correspondence is especially invited from motor vehicle manufacturers and users.

## G. C. VAPORIZER COMPANY

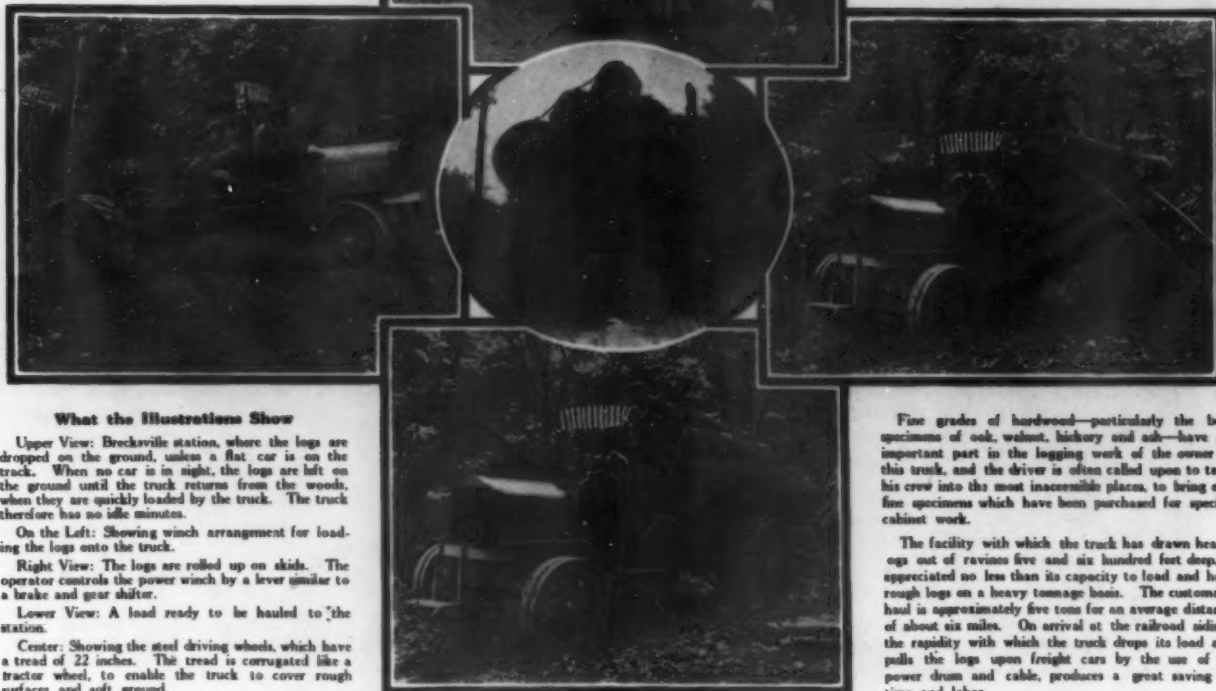
OF AMERICA, Inc.

1790 Broadway, New York

When Writing, Please Say—"Saw Your Ad. in the C C J"

## Commercial Cars Revolutionize the Lumber Industry

What a Five-Ton White Log Tractor, Owned by Theodor Kuntz, of Cleveland, is Doing in the Woods Near Brecksville, in the Southern Part of Cuyahoga County, Ohio.



### What the Illustrations Show

Upper View: Brecksville station, where the logs are dropped on the ground, unless a flat car is on the track. When no car is in sight, the logs are left on the ground until the truck returns from the woods, when they are quickly loaded by the truck. The truck therefore has no idle minutes.

On the Left: Showing winch arrangement for loading the logs onto the truck.

Right View: The logs are rolled up on skids. The operator controls the power winch by a lever similar to a brake and gear shifter.

Lower View: A load ready to be hauled to the station.

Center: Showing the steel driving wheels, which have a tread of 22 inches. The tread is corrugated like a tractor wheel, to enable the truck to cover rough surfaces and soft ground.

### What the Truck Does

In the first place, it replaces on a small scale, the work of the logging locomotive, the skidder and the donkey engine. In addition, it automatically loads the truck by its own power and then transfers its load from truck to flat car by that same power.

By proper use of the power winch and a simple scheme of rope and chain tackle, the crew have loaded one thousand feet of lumber on the truck in twenty minutes. Furthermore, its remarkable capacity for loading is availed of in many ways, notably in the salvage of fine specimens of hardwood which frequently fall into ravines, and cannot be recovered except at the prohibitive cost of installing donkey engines and moving them from place to place, or else diverting the use of horses from more systematic and profitable work.

Five grades of hardwood—particularly the best specimens of oak, walnut, hickory and ash—have an important part in the logging work of the owner of this truck, and the driver is often called upon to take his crew into the most inaccessible places, to bring out fine specimens which have been purchased for specific cabinet work.

The facility with which the truck has drawn heavy logs out of ravines five and six hundred feet deep, is appreciated no less than its capacity to load and haul rough logs on a heavy tonnage basis. The customary haul is approximately five tons for an average distance of about six miles. On arrival at the railroad siding, the rapidity with which the truck drops its load and pulls the logs upon freight cars by the use of its power drum and cable, produces a great saving of time and labor.

## The truck will increase your business and decrease your expenses

odometer, arriving at 1.05 P. M. Loading was again begun at 1.35 P. M., an hour and five minutes being required, the truck leaving at 2.40 P. M. In the afternoon it made 23 stops in 4 hours and 50 minutes, covering 21.6 miles, returning at 7.30 P. M., after covering a total distance of 38.8 miles, having made 47 stops. If demountable bodies were used it would have been possible for the first load to have been placed in the empty body the previous afternoon and the truck would have been ready to leave on its first trip five minutes after seven, almost immediately after reaching the loading platform. Thus a saving on the first trip of 1 hour, 50 minutes would have been made, meaning earlier delivery of the goods to the retail stores and less congestion at the loading platform owing to the trucks not being held there in the way. A saving of 1 hour could be made on the second trip, or 2 hours and 50 minutes on the two trips, or a saving of 28 per cent. of the 10 hour working day.

Mileage per day (2 trips) .....	41.9
Tons hauled .....	10
Number of stops .....	46

Actual running time .....	6 Hrs. 15 Min.
Actual standing time .....	6 Hrs. 44 Min.
Standing time at loading end .....	3 Hrs. 1 Min.

Considering that the average 2 horse truck only hauls a load of about 7000 lbs. to 8000 lbs. per trip, it would require 3 horse trucks to haul the tonnage and cover the mileage made in this demonstration.

The actual cost of operating the truck including all fixed and variable charges is \$13.89. Approximate cost of three 2-horse teams is \$6.50 per day, or \$19.50, a saving per day of \$5.61, or a yearly saving of \$1683.

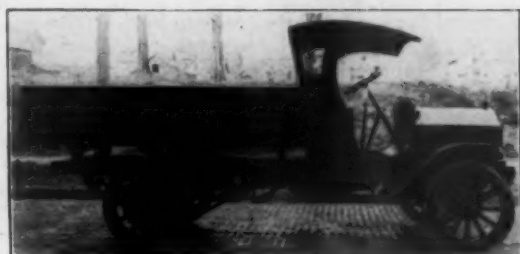
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Advertisements will be inserted under this head for 1 cent a word; name and address must be counted in; no order less than 25 cents.

MANAGER FOR MOTOR TRUCK SERVICE—A TRAINED executive desires to communicate with firm operating commercial vehicles; understands thoroughly their efficient operation and upkeep; extended experience in purchasing supplies for maintenance; can install a system of records showing cost of operation; competent transportation and traffic man. Address MANAGER, 1 West 34th Street, New York.

# WILCOX TRUX

One Ton  
Two Ton  
Three Ton



The 1-ton truck used by the Liquid Carbonic Company is an example of the adaptability of Wilcox Trux

WILCOX TRUX suit  
every line of business.

WILCOX TRUX are  
the very best sellers for live  
business men throughout  
the country.

We are open for a few more good,  
live agents. Write us today. Let us  
show you how to build up a pros-  
perous motor truck business.

**PIONEER MOTOR  
TRUCK BUILDERS.  
ESTABLISHED 1906**

**H. E. Wilcox Motor Car Co.**  
1049 Marshall St., N. E.  
Minneapolis, U. S. A.

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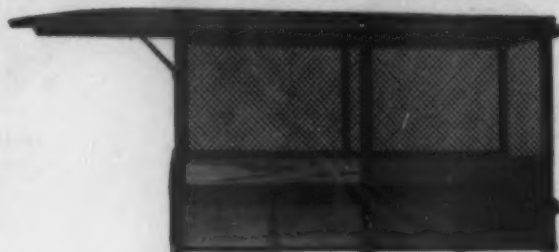
## Motor Truck Sales

### Attention, Manufacturers Only

The undersigned has had twelve years' experience exclusively in the Sales end of the Motor Truck Business, eleven of which were in association with J. M. Mack, of Allentown, Pennsylvania—pioneer designer and builder of Motor Trucks in the United States. During eleven years with the Mack Brothers Motor Car Company has had complete charge of the Sales Work and has assisted in all Financial and Confidential matters. For the past 18 months engaged as General Sales Agent for International Motor Company. In view of existing conditions of present connection is open for proposition covering similar work with responsible manufacturer. Can build up an efficient organization which can get results, or can be of valuable assistance in expanding present organization. Best references, financial and otherwise. Those interested apply to

**W. S. Stevenson,**  
Hotel Woodstock,  
New York

## Highland Standard Bodies FOR MOTOR TRUCKS



### TO STANDARDIZE IS TO ECONOMIZE

**T**HE Motor Truck Manufacturers by adopting the *Standard Highland Bodies* economize in first cost, capital invested, floor space, and in time.

*The Motor Truck Dealer* by specifying *Standard Highland Bodies* economizes in first cost, time of delivery, and is assured a body designed and built for motor truck service.

*The Motor Truck User* by insisting on a *Standard Highland Body* economizes in first cost, maintenance charges, and loss of service due to delay in delivery of truck, and time taken for repairs.

*Standard Highland Bodies* are guaranteed for the life of the truck.

Send for catalog giving list of sizes.

**THE HIGHLAND BODY MFG. CO.**  
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### YOU CAN BOOST

an Edison Storage Battery for short periods at 3 or 4 times the normal charging rate without injury. Every hour saved in boosting is an hour **overtime** saved on driver's wages.



### YOU CAN'T KILL

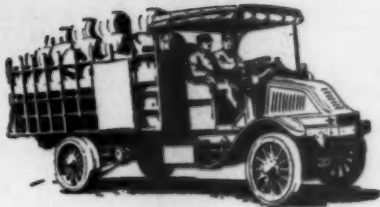
an Edison Storage Battery by overcharging it, completely discharging it, or letting it stand idle. It is one of those good servants that require no watching—working or loafing.

There is a book which gives a non-technical description of the construction, application and operation of Edison Cells. Did you get it? It's called Bulletin No. 1015.

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Kelly service is legitimate service in every sense. We can give this real service because we have built up the entire Kelly organization with that idea in mind.

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Boston	San Francisco
Providence	New York
Worcester	Philadelphia
New Haven	Birmingham
Cleveland	Kansas City
Chicago	Dallas
Seattle	Los Angeles

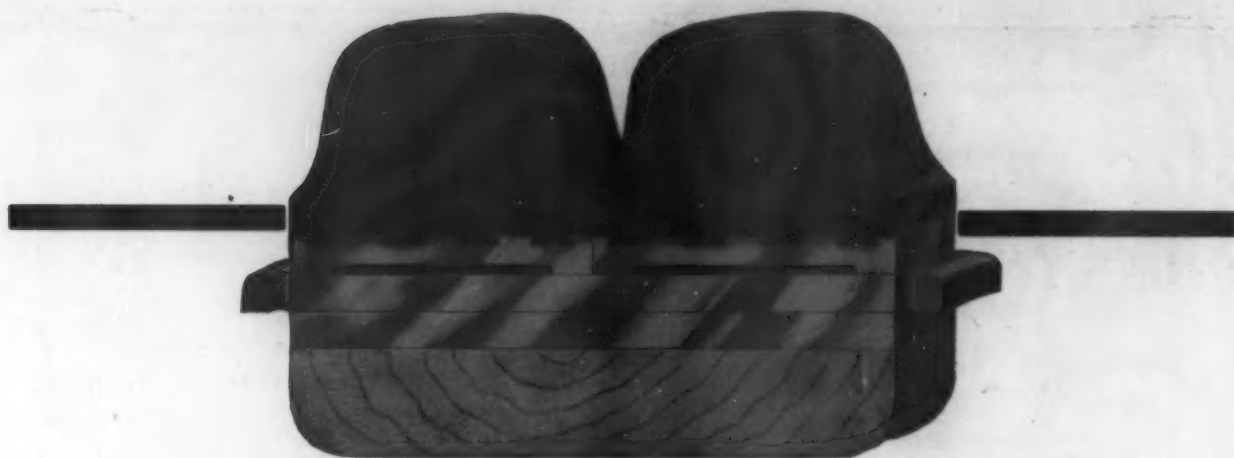
No matter where you may be, you are within a few hours of one of these service stations. The necessary parts or equipment for any repairs can be dispatched to you from one of these stations without an instant's delay. The advantage of this plan can be seen readily by those who have often been compelled to wait many days for repair parts to be sent from a distant factory.

You have to know Kelly Service before you can really appreciate what it means to our dealers.

## KELLY SERVICE

**THE KELLY-SPRINGFIELD MOTOR TRUCK COMPANY**  
603 Burt Street, Springfield, Ohio

(21)



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(DUAL OR SINGLE)

## **WIRELESS TIRES**

ARE

## **3 YEARS AHEAD**

"Imitation is the sincerest flattery;" but is the imitation your best investment? **GIBNEY WIRELESS TIRES** were made three years before being copied by other tire manufacturers.

From the beginning they proved to be the

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**GIBNEY** exclusive dealers are just as far ahead in sales as we are in manufacturing. Write us about it. The demand is increasing by leaps and bounds.

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**TIRE & RUBBER**  
**COMPANY**



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KNOXVILLE, TENN.	104 Tennessee Avenue
SAN FRANCISCO	268 Market Street
SYRACUSE, N. Y.	487 South Salina Street

There are a few good people who do not use good lubricant.

This is either because they don't realize the vital importance of the question of lubrication, or because they don't care what they use so long as it looks as though it would lubricate.

Some greases sold as lubricants are nothing more or less than soft soap with a dangerous friction-producing "filler" incorporated to give them body.

This filler may be resin, resinous oils, tallow, wax, graphite, talc or what-not.

Such grease will not only fail to reduce friction, *but will actually cause friction* and very often corrode the bearing.

You can't expect to reduce the natural friction of the bearings by introducing a "lubricant" which contains friction-producing qualities itself.

Keystone Grease is *pure petroleum* grease, free from acid or "fillers" of any kind, and will reduce friction to a minimum.

### KEYSTONE LUBRICATING CO.

*Executive Offices and Works*

TWENTY-FIRST, CLEARFIELD & LIPPINCOTT STREETS  
ESTABLISHED 1884 PHILADELPHIA

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A STANDARD BODY, PRICE COMPLETE, \$1850. With Other Body Styles, \$1775 to \$1850

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demands the best that your customers' money can buy—exactly what every BROWN DEALER has to offer. Talk helps sell cars—but it must be backed up by FACTS. The dealer who handles the best car made at the price, is *bound* to *win out* in the long run.

We want every progressive dealer to submit the BROWN Delivery Car to the most searching tests and comparisons possible—and decide whether he prefers to COMPETE with BROWN Cars or SELL them.

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PERU, INDIANA

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# How to Have a New Car All the Time

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for*



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Book*

For the owner, or for the man who finishes autos and carriages, the little booklet entitled "The Care of the Car" will be found full of practical suggestions.

It tells the owner how to keep his car in the best of condition and what to specify when having the car done over.

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WATER-COOLED  
ENGINE

NO GEARS TO  
STRIP

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EASY SPRING  
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*Address the New York Office*

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## TARRYTOWN MOTOR CAR CO., INC.

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NEW YORK OFFICE—1790 BROADWAY

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**This valuable  
handbook free—  
to those interested in  
motor trucks**



Here is the most valuable handbook of Motor Trucks ever published. It gives photographic reproductions, specifications and the essential features of over sixty American-made Motor Trucks. It is issued by the makers of

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his truck**

This book is absolutely authentic in every way. The latest models are shown and all information is up-to-date for 1913. In preparing this book we said to the various truck manufacturers, "We are going to give you the opportunity to put the salient features of your trucks before thousands of prospective buyers of motor trucks. We will allot you one page. Fill that page with the most important things you want people to know about your trucks."

**This will give you an idea of the kind  
of information contained in  
this book**

The book contains clear, concise information upon trucks of all makes and sizes. The specifications of each capacity cover horsepower; wheelbase; tires, front and rear; frame; front axle; rear axle; carburetor; cooling system; ignition; control; clutch; transmission; drive; springs; steering gear and tire equipment. Many truck makers add the list of accessories which constitute equipment, together with other specific information which differentiate their trucks from others.

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*Makers of Goodrich Tires and Everything That's Best in Rubber*

**Factories: Akron, Ohio**

**Branches in All Principal Cities**

*There is nothing in Goodrich advertising that isn't in Goodrich Goods*

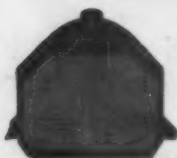


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EFFICIENCY, DURABILITY AND APPEARANCE OF "LONG" RADIATORS HAVE MADE THEM STANDARD EQUIPMENT ON THE WORLD'S BEST CARS.



Cellular

The "LONG" Honeycomb type of radiator is particularly adapted to commercial purposes. The Honeycomb effect is obtained by means of corrugated strips between the flat vertical water tubes. The corrugations extend in front of the tubes to protect same from puncture. The tubes are simply large and run straight from tank to tank. There is no danger of clogging and no restriction to water flow. Our spiral tubing is very desirable for the large and heavy power wagons. Any design or contour is easily made with our facilities. Our factory organization and facilities guarantee the highest service, quality and workmanship that is possible to reach. Our engineering department is at your service. Write for catalog; send in your blue prints. Inquiries will gladly be followed by personal calls from us.



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CELLULAR TYPE FOR PLEASURE CARS AND LIGHT COMMERCIAL CARS.

HONEYCOMB AND SPIRAL TUBE TYPES FOR HEAVY TRUCKS AND TRACTORS.



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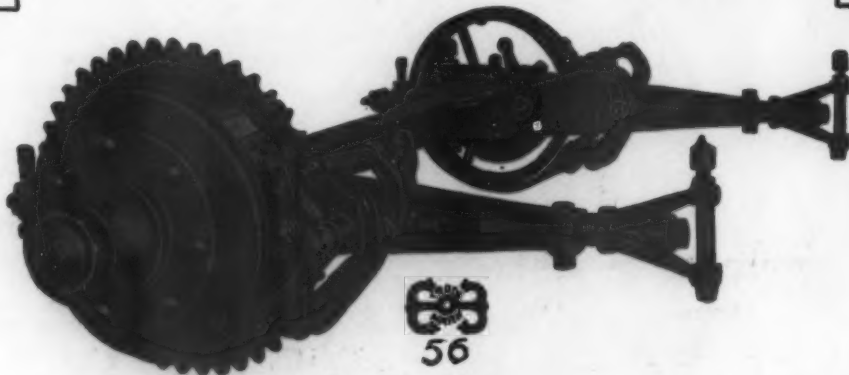
**LONG MANUFACTURING COMPANY**  
DETROIT, MICH.





# ARMY TAKES NO CHANCES WITH JACK-SHAFT BRAKES

## SHELDON DOUBLE BRAKES ON REAR WHEELS PASS GOVERNMENT SPECIFICATIONS



Chief of Quartermasters' Corps of War Department issues specifications for Motor Trucks for Army use.

**"BRAKES—Two sets, both attached to rear wheels; one set operated by pedal, other by lever."**

The Army Takes No Chances With Jack-Shaft Brakes; by specifying both BRAKES ON REAR WHEELS.

SHELDON DOUBLE BRAKES ON REAR WHEELS conform to Government Specifications.

Equip your trucks with SHELDON BRAKES, and bid on the Army Requirements.

A Jack-Shaft Brake is no stronger than the chains. If the chain breaks or jumps the sprocket, will the truck stop? ? ? ? ?

You can never depend on jack-shaft brakes skidding the wheels—Either one of SHELDON'S DOUBLE BRAKES WILL DO IT.

**SHELDON AXLE COMPANY, Wilkes-Barre, Pa.**

CHICAGO OFFICE—48 East 12th St.

DETROIT OFFICE—1215 Woodward Ave.

SAN FRANCISCO OFFICE—444 Market St.

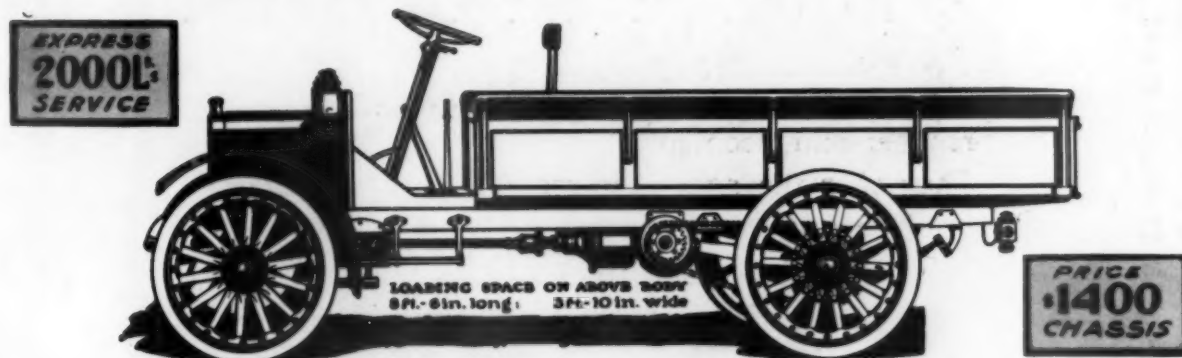


## Greatest Value in the Field Today

### An Enlargement and Refinement of an Originally Good Wagon

**J**UST as one certain machine in the pleasure field proved a sensation and set the pace for popular-priced cars, just that is this **Mora** in the commercial field. It's bound to

be a winner—never before has so much real value per dollar been offered—especially with such a make-good assurance, for it's born of a wagon that *made good* with a vengeance.



"Commercially Right" tersely yet comprehensively describes that thorough appreciation of, and careful attention to those details that make the **Mora** a *thoroughbred* business wagon.

You'll find in it the generally accepted engineering points of real practical worth improved upon by an array of its own exclusive features.

There isn't another such motor in an express service vehicle. Not an adaptation of a pleasure car motor, but a sturdy, 25 H.P., long stroke, 4-cylinder engine, built for the grind, from big

### A Thoroughbred

water jackets in to its *self-aligning* crankshaft ball bearings—working parts about 35% heavier than the usual engineering practise in pleasure car motors of the same size.

You can only appreciate the wonderful cooling efficiency of the **Mora** radiator when you consider that its total cellular cooling surface is 10,506 sq. in.—largest radiator on any machine of this size and larger than on many bigger ones.

No higher priced car can boast of a cleaner cut and more practical rear construction. Then combine with all this that generous mechanical "factor of safety" characterizing the **Mora**, making it a wagon of service *plus*.

Up-to-the-minute in every detail. If you're interested in maximum service at minimum up-keep cost, it's up to you to get further **Mora** information—and that "right quick." There's that coupon in the corner.

### DEALERS—Your One Big Chance

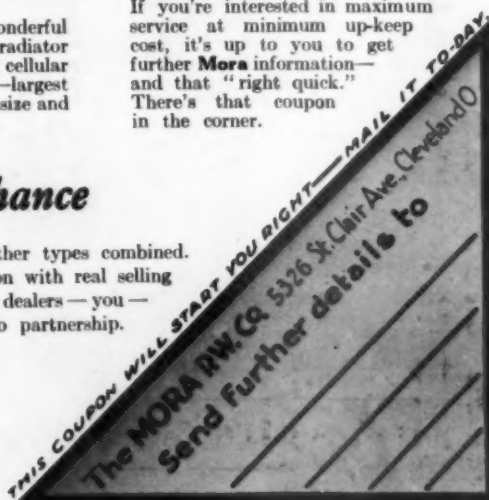
**T**HERE is a bigger demand for express service vehicles than for all other types combined. Get started right. This **Mora's** the wagon to do it with. It's the wagon with real selling points, and our dealer proposition's a crackerjack. We want live dealers—you—because you wouldn't be reading this paper if you weren't live. Let's go into partnership. The coupon's handy.

**The MORA POWER WAGON®**

5326 St. Clair Avenue

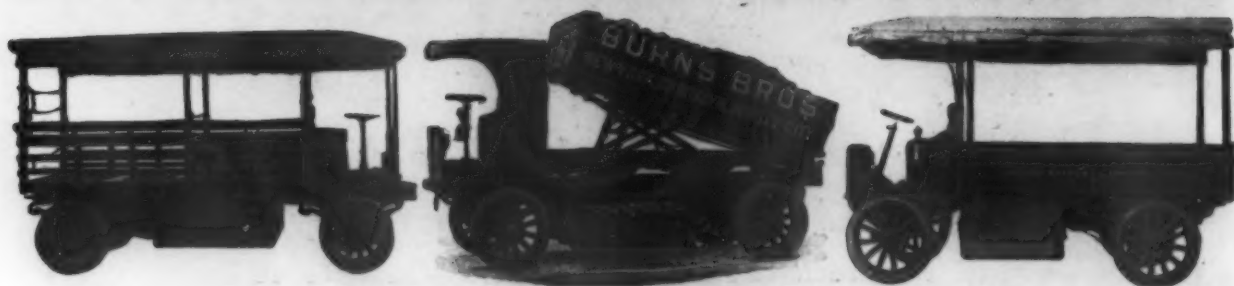
Cleveland, Ohio

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# ELECTRIC



## TEN YEARS CONTINUED SERVICE

has proven the Lansden trucks to be the most reliable and economical means of transportation. They offer the agent the most attractive outlook. We have openings for agents in a few good territories. We invite applications from

**DEALERS, Power Stations  
and Garages**

Write for Agency Proposition  
Sizes, 750 Lbs. to Ten Tons

**THE LANSDEN COMPANY**  
NEWARK, NEW JERSEY

# ELECTRIC

When Writing, Please Say—"Saw Your Ad. in the C C J"



## DON'T FORGET

that the real utility of your truck is largely dependent upon the quality of its wheels. If you are continually spending time and money repairing wheels, if your delivery service is to be held up for wheel replacements, you had better get back your horses, and exchange your gasoline for hay. The wheels are the real burden bearers, they

carry all the load, and suffer all the shocks and strains. The service, the endurance, and the safety of the truck depend upon them. Inferior wheels and trouble are first cousins, and spend a lot of time together.

## BUT REMEMBER

that the best insurance against breakdown and the need for wheel replacement and repair is an equipment of **SCHWARZ WHEELS**. They are universally acknowledged to be the strongest and safest, and they are carrying the burdens of America's best trucks. The interlocking spokes

form a rigid, immovable center assemblage, which will stand up under the most severe strains, and always run true. You must look to the wheels, if you want motor truck efficiency.

**Strongest, Safest, Most Economical**

The Universal Verdict of All Automobile Engineers

Consult Us. Write for Literature

**THE SCHWARZ WHEEL CO., Frankford, Phila., Pa.**

When Writing, Please Say—"Saw Your Ad. in the C C J"



**L**IFE is just one big opportunity after another to the man who is wide awake enough to realize it.

You don't have to work overtime knocking your competitors if you are handling the Stewart Trucks.

The one big opportunity for you, Mr. Agent, is the Stewart One-Ton Truck.

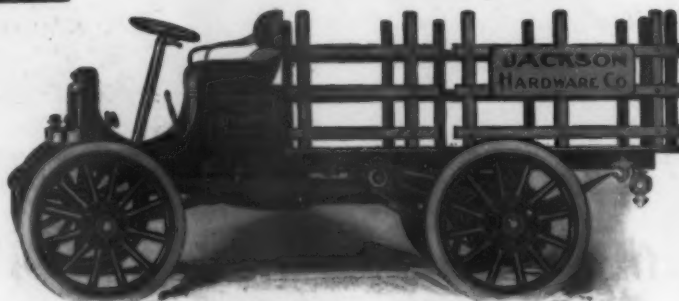
Don't miss it. Write us at once.

**\$986**

**Stake or Express Body**

F. O. B. Cincinnati  
Completely Equipped

Capacity 2000 Pounds  
Guaranteed for 50% overload



**YOU CAN PAY MORE BUT  
YOU CAN'T BUY MORE**

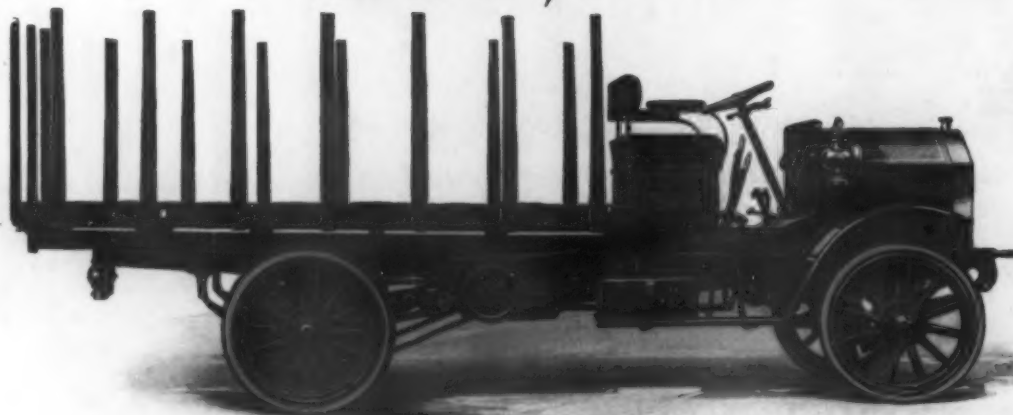
**"THE TRUCK THAT MAKES HORSES A LUXURY"**

**THE STEWART IRON WORKS COMPANY :: CINCINNATI, OHIO**

**2 Ton**

**THE Rockford**

**Price  
\$2,500**



Considering quality, this truck is the best value in the market to-day. Every part selected with the greatest care, regardless of cost. Ask us for particulars. A few good agencies are open.

**ROCKFORD MOTOR TRUCK CO.**

**::**

**ROCKFORD, ILL.**

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## Overhaul Your Brakes

Make your truck SAFE. See that the brake-lining is in good condition, for upon the lining will depend the safety of your truck.

If you need NEW lining, be sure to buy the best. Get the Standard brake lining—get

**Raybestos**  
TRADE MARK  
REG. U.S. PAT. OFF.

"THE ORIGINAL AND BEST ASBESTOS BRAKE LINING"

Used and recommended by all motorists, dealers and manufacturers who are not swayed by "price." We stamp the name in every foot of the lining to protect you from inferior substitutes.

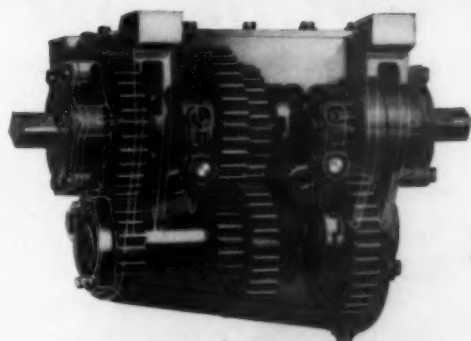
### THE ROYAL EQUIPMENT CO.

Railroad and Bostwick Aves.  
BRIDGEPORT, CONN.

We also make Duplex and Raymond Brakes and Gyrex, the Mixer



## COTTA TRANSMISSIONS



Internal View of Shaft-Drive Transmission, designed for use in worm-drive trucks

### For Heavy Truck and Tractor Service Eliminate Transmission Trouble

Selective type, individual clutch system. All gears always in mesh. Countershaft and mainshaft gears idle on direct. Improved speed-changing device. No plain bearings—loose gears mounted on roller bearings.

*Write for Bulletin*

**COTTA TRANSMISSION CO.**  
814 So. Main Street Rockford, Illinois

## REDUCTION IN THE PRICE OF GASOLINE



## PISTON RINGS

not only reduce the cost of your gasoline, they also keep down the cost of engine repairs and replacement.

**Leak-Proof** Piston Rings guarantee compression. It is that lost compression that wastes fuel. If, when a cylinder full of vaporized gasoline is exploded, the force of that explosion is allowed to slip past faulty piston rings, full power cannot be developed. At the same time the ordinary piston ring allows oil to get into the exploding chamber, causing carbonization and black smoke.

**Leak-Proof** Rings are an absolute cure for these defects.

## "ASK THE USER"

Tens of thousands in use today are proof of their efficiency. There has never been a "come-back."

## McQUAY-NORRIS MFG. CO.

1309 Chestnut St. Dept. "C" St. Louis, Mo.

### Branch Offices:

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H. O. Paro,	W. H. Steele,
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PITTSBURGH, PA.	FORT WORTH, TEXAS
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7630 Tioga Street	100 Bryan Avenue
SAN FRANCISCO, CAL.	
Wm. B. Godfrey, 268 Market Street	

When Writing, Please Say—"Saw Your Ad. in the C C J"

# Our Success, Mr. Dealer Depends On Your Success

And neither of us can expect any great success unless we have a better selling proposition than the other fellow—unless we can give the customer more for his money.

We think we can. What's your opinion?

For a **REAL ONE-TON TRUCK**—that's our offer.

## Read These Specifications:

30 H. P. Continental Motor, automatic governor, Bosch Ignition—Brown Lipe, 3 speed (heavy duty type) transmission—full floating jackshaft—16" Brakes—36" wheels and tires—extra heavy axles (1 $\frac{1}{4}$ " x 2 $\frac{1}{4}$ " ), frame and springs—9 ft. 7 in. Body—complete at

## \$1550

Not a "feature" in its whole construction, every unit tried and proven, and now recognized as the standard.

Don't think that because our price is from \$350 to \$600 lower than competition, that we have cheapened anything—we haven't—been in the business too long to try to "slip anything over." We're after volume, and the only way we know how to get it is to get the price down to rock bottom.

Get our proposition—it will interest you, or it should, because they are going to buy trucks in your town this season.

We can make immediate deliveries.

## Hercules Motor Truck Company

State Street  
Detroit, Michigan

# SPLITDORF

"Always There"

SPLITDORF "TS" COILS are the newest and most serviceable transformers on the market today. Equally effective with the older as well as the latest SPLITDORF magnetos, the "TS" COILS can be relied upon at all times.

Its neat appearance, with kick switch, ignition button for battery connection and lock and key for the whole operation, is only in keeping with its real effectiveness and durability.

Enclosed in a light waterproof case, it has an electrical construction that makes its firing qualities with an engine unsurpassed by any other coil.

"New Ignition for old" is a SPECIAL EXCHANGE proposition that can not fail to interest every owner of a gasoline motor that is not equipped with SPLITDORF up-to-the-minute ignition. If you want to save time and money, write TODAY for particulars.

**SPLITDORF ELECTRICAL CO.**  
98 Warren Street, Newark, N. J.

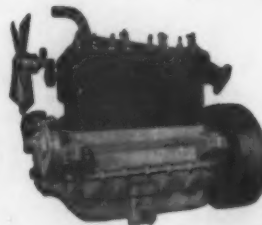
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# Continental

The Standard Motor for pleasure cars  
and motor trucks of quality.



Built by the world's  
largest motor manufacturers.

Continental motors  
carry a prestige and  
guarantee of worth for  
the products they propel.

4 and 6-cylinder types for every motor need.

Adapted to any self-starter.

## Continental Motor Mfg. Co.

Detroit, Michigan

FACTORY REPRESENTATIVE:

K. F. PETERSON  
122 Michigan Blvd., Chicago, Ill.

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ALL THIS INFORMATION  
About ALL CARS for ONLY \$1



## 1913 Table of Specifications of Gasoline Commercial Cars

PRICE, \$1.00

Issued by

COMMERCIAL  
CAR JOURNAL

Published in Philadelphia

Every Specification and Measurement of Every  
Commercial Car Manufactured.

**Absolutely Complete** from Wheel Base  
to Size of Spark Plug.

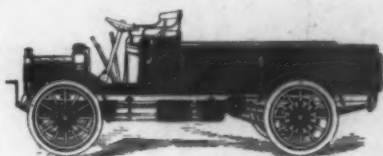
*How many times would you have given  
ten times its price for the facts about just  
one part of one car?*

Here is the measurement, capacity, tire equipment, control, cost, **everything**—about each and every commercial car manufactured, and costs you only \$1. Furnished as a wall-hanger, 4' x 2'-8", or in a convenient pocket size.

We also publish complete specifications of Pleasure Cars at the same price, in both hanger and pocket form. State which you desire, the wall-hanger or pocketbook size. If you order both the Pleasure Car and Commercial Car Specification Charts at one time, remit \$1.50, which is the special combination price. Order today before you forget.

# CHILTON COMPANY, PHILADELPHIA





BESSEMER owners will tell you it is the best truck for you to buy. Repeat orders prove this.

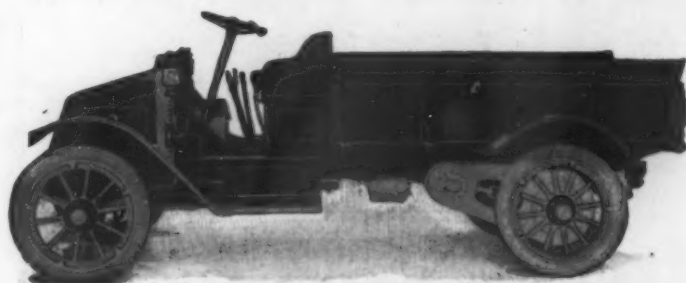
With 15 years' manufacturing experience why shouldn't we turn out a car mechanically right and with correct design? We believe that there are no trucks on the market offering better values than the BESSEMER line.

1500 lb.  
\$1250.00

2000 lb.  
\$1800.00

3000 lb.  
\$2100.00

**BESSEMER MOTOR TRUCK COMPANY, GROVE CITY PA.**



Sandusky Model "B" 1500 lb. Delivery Truck  
Price complete, as shown, \$1500.00

Constructed for hard business service—not of pleasure-car type.

Designed for economical operation.

Long stroke, 30 H. P., 4 cylinder, 4 cycle motor, equipped with governor to control speed.

Selective sliding gear transmission.

Double chain drive with chains enclosed.

Center control with left-hand drive.

QUIET and absolutely RELIABLE.

Not an assembly proposition, but manufactured by us in our factory, as is also our 1½ ton truck.

Write us. Do it today.

**Sandusky Auto Parts & Motor Truck Co.**  
Sandusky, Ohio, U. S. A.

## THE RUTENBER MOTOR

Manufactured since 1901 for high-grade

### Automobiles and Trucks

3¼ x 5¼ four and six cylinder

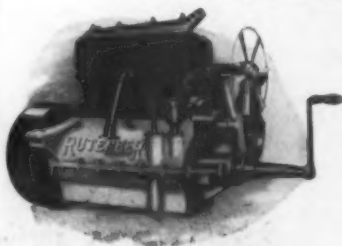
4¼ x 5¼ four and six cylinder

Standard or Unit

and

4 x 4, 4½ x 5 and 4¾ x 5 Standard Types

All L-Head, 4-Cycle



Manufacturers are invited to investigate our service and our facilities. Literature on request.

**The Rutember Motor Company**  
MARION, INDIANA

## The Gould Storage Battery Has High Capacity, Long Life, and Is Safest From Damage.



The superiority of the Gould Storage Battery comes largely from the fact that every particle of oxide in the positive plate, through our exclusive binding and hardening process, does maximum work before dislodging.

Electric trucks equipped with Gould Batteries therefore assure maximum mileage, constantly dependable service and such reasonable operating cost that manufacturing or commercial organizations cannot profitably neglect this means of transporting material.

Let us quote on your next battery. Gould Battery renews fit jars of any make.

WRITE FOR LITERATURE TODAY

**Gould Storage Battery Co.**

General Offices: 30 E. 42nd St., New York

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Agents in all large cities

Full stock carried in all cities where we have offices or agents.

(67)

## Steel Tanks

### Air-Starter Tanks Gasolene Feed Tanks

Our extensive manufacturing facilities enable us to meet your every requirement.



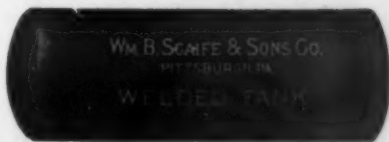
111 years old. Founded 1802

### Wm. B. Scaife & Sons Co.

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26 Cortlandt Street

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Send also for catalog of  
**GASOLENE STORAGE OUTFITS**



## WAUKESHA

### 4 1/2 x 6 1/2 LONG STROKE TRUCK MOTOR.

THE Waukesha Long Stroke Truck Motor is designed solely to meet the requirements of truck service and so solves with maximum efficiency the truck user's delivery problem.

It is the truck manufacturer's strongest justification for re-orders. Its positive, definite, unvarying efficiency under all working conditions gives the purchaser of the first truck a totally new idea in truck service that makes your hold on his future truck requirements a foregone conclusion.

Exclusive processes in metals used gives the Waukesha strength unapproached by any other motor. The crankshaft has a tensile strength of 140,000 lbs. to the square inch. The bearings have greater resistance than the best Parsons' White Brass. The unusual strength of these two features is but an index to the character of the motor as a whole.

As a progressive manufacturer of trucks you should at least know all about the Waukesha. Your request will bring full information.

**WAUKESHA MOTOR CO.**  
WAUKESHA Dept. A. WISCONSIN

**AN EXCEPTIONAL MOTOR.**

1909

1913

### Pioneer Truck Steering Gear Mfrs.



We make more steering gears for commercial vehicles than any other manufacturer.

### WHY?

Because the truck manufacturers recognize that the Lavigne all-steel gear is of superior design and the ultimate user knows it.

Standard For:—Commercial Cars, Trucks, Tractors, and High-Grade Pleasure Cars.

Write for Blue Prints

**THE LAVIGNE GEAR CO.**  
STATION A RACINE, WIS.

## TRANSMISSIONS

**Made by Specialists**

**COVERT TRANSMISSIONS GIVE** perfect service, because they are designed and built by men thoroughly acquainted with every requirement that is made by a motor car transmission.

For Commercial Vehicles of from 500 to 10,000 lbs. capacity.

For Pleasure Cars of from 20 to 60 H. P.

**Covert Motor Vehicle Co.**

Sales Office—  
Detroit, Mich.

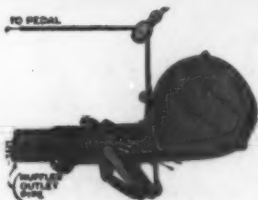
Factory—  
Lockport, N. Y.

When Writing, Please Say—"Saw Your Ad. in the C C J"

**Warn the Pedestrian—Don't Frighten Him.**  
The motor truck, used mostly in the crowded streets of the city, is in especial need of a reliable signal that always warns and never startles.

# Jericho

ASK  
ANY  
DEALER



ASK  
ANY  
USER

Jericho is sturdily built and will withstand rough usage. It can't clog; its pedal-control leaves the driver's hands free; its exhaust-operation saves you maintenance expense. Prices: \$7, \$8, \$9, \$10.

## Jericho for Ford Cars

A specially made model of Jericho with all Jericho's good points. Every Ford Delivery Car should be equipped with one. Price \$5.

Attached in a few minutes—and you'll never take it off.

**The Randall-Faichney Co.,** Jamaica Plain, Boston, Mass.

Also makers of Jubilee Horn, B-Line Guns, MacKee-Blitz Spark Plugs, Jericho Gas Regulators, and other automobile accessories.

## How Much Money Do Your Motor Trucks Waste?

If you could be with each of your vehicles for one day, you would be amazed at the time that is lost at loading stations and on the road—time which you could save if you knew about it. This waste of overhead charges and investment amounts to more than the waste of fuel, tires, oil and repairs, all combined.

Did you know, for instance, that there are \$5000 and \$6000 trucks in use with an actual running time of less than three hours a day?

Probably your vehicles do more work than this. But do you *know* exactly how many hours each of them worked *yesterday*?—when they were idle?—for how long?

If you had a daily chart—accurate—easily read—showing these facts, you could save hundreds of dollars a year.

## The Servis Recorder

gives such a record. It is saving money for hundreds of concerns, in every class of business. It has no gears, shaft, or outside connection to the running gear or motor.

It will cost you nothing to investigate. Write today for literature and names of owners.

**The Service Recorder Co.**  
2425 East 105th Street, Cleveland, Ohio

## Chrome VANADIUM Steel

The desire for increased strength in the automobile with reduced weight has resulted in the annual output of more than one hundred thousand motor cars in which those parts subjected to excessive strains are made of Chrome Vanadium steel.

This severe service test has proven to one industry the high standard of our product.

Our Chrome Vanadium Steel is the result of many years of experience and experiments.

We were the pioneers in this field of venture and we make this product under our own secret process, patents for which are now pending.

Probably we can give you some valuable advice concerning the reduction of your own breakage troubles.

*Just drop us a line today*

**The United Steel Company**  
CANTON, OHIO

New York Chicago Cincinnati Detroit

## Motor Truck Bands

MADE WITHIN THE FOLLOWING

### Dimensional Tolerances

(ADOPTED BY THE SOCIETY OF AUTOMOBILE ENG.)

#### 1.—Tolerance in circumference of felloe band:

		Plus	Minus
Before application to wheel	- -	1-32"	1-32"
After	" " " - -	1-16"	1-32"

Variation from precise measurement shall be uniform over entire width of band.

#### 2.—Tolerance in width of felloe band:

		Plus	Minus
Up to and including 4"	- - -	1-32"	1-32"
4—1-16" to 6"	- - -	3-64"	3-64"
6—1-16" to 12"	- - -	1-16"	1-16"

#### 3.—Variation in trueness of band when placed on surface plate: Band shall touch at all points within 1-32" up to and including 6" width. Over 6" width within 1-16".

#### 4.—Variation in thickness of band: .006" plus or minus.

#### 5.—Trueness to round. The radial tolerance on the wheel when felloe band is applied shall be 1-16" plus or minus. This plus or minus tolerance must not occur at diametrically opposite points. There shall be no flat spots or kinks in felloe band on the finished wheel.

**The Standard Welding Company**  
CLEVELAND

NEW YORK

CHICAGO

DETROIT



## Tire economy and the PIERCE-ARROW 5-TON MOTOR TRUCKS

It is not usual for motor truck tires to last much beyond the tiremaker's guarantee of 8,000 miles.

But records kept on a vast number of Pierce-Arrow Trucks show that the average mileage, given by the several makes of tires used, is considerably larger than this—that in many cases the original tires have given *double* the guaranteed mileage, and are still running.

This is largely because the worm-gear drive and the distribution of 85% of weight on the rear wheels keep these wheels from jerking and grinding the road—and because of the Pierce-Arrow's flexible frame.

Tire cost is the largest single item in motor-truck operation. Be sure to consider tire economy when making your selection. It is only one of the economies obtained in the Pierce-Arrow Motor Truck.

THE PIERCE-ARROW MOTOR CAR COMPANY, BUFFALO, N. Y.

## PRESSED STEEL FRAMES FOR TRUCKS

Handsome, Light, and  
more enduring than those  
made of rolled channel

**A. O. SMITH COMPANY**  
MILWAUKEE

## Noiseless—Unlooseable

### M & E Grease Cups

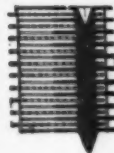


Are constructed so that the cap can neither rattle nor be lost. The end (B) of spiral spring acts as a pawl catching in corrugations (A) in the cap. When cap is turned the pawl slips from notch to notch and prevents vibrating loose. They lubricate perfectly. Made in brass or steel as short or long as desired. Are standard of the world and used exclusively by the best car manufacturers.

At dealers or write for catalog 23 and samples

USED ON OVER 100,000 PLEASURE AND  
COMMERCIAL CARS OF OVER 250 MAKES

### The EVANS Model "HELE-SHAW" CLUTCH



Multiple disc running in oil. Illustration shows its exclusive design—discs having wedge-shaped annular grooves which have a grip like a vise, yet are slippable indefinitely. The most perfect clutch made—most durable, gives absolute control, perfect safety and eliminates the jerk.

Write for Catalog 7 for complete data

**MERCHANT & EVANS COMPANY**  
PHILADELPHIA

New York Brooklyn Baltimore Wheeling  
Cleveland Chicago Kansas City



## ACME Universal Joints



### For Motor Trucks—

Accurate—Durable—Efficient  
Absolutely Dust-Proof

Leading motor truck makers have adopted exclusively the **Acme**, due to improved mechanical features not found on any other universal joint.

We specialize on universals for motor trucks and are in position to meet your every requirement.

Ask for catalog and send your specifications.

**ACME UNIVERSAL JOINT CO.**  
1421 Fulford Street Kalamazoo, Mich.

**"BEST"**

1000 to 1250 lbs. Capacity

42" x 72" Loading Space

Price, with Top, Pneumatic Tires } **\$925.00**

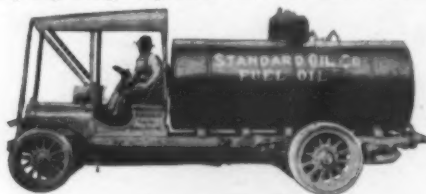
FLINT MOTOR WAGON DEPT.

**DURANT-DORT CARRIAGE CO.**  
FLINT, MICH.Model  
"B"  
2-TonChassis  
\$2100**WICHITA TRUCKS**

1 and 2 Ton Capacities

**Dealers:** Write or wire us for sales proposition,  
territory is being snapped up rapidly.**Wichita Falls Motor Company**  
WICHITA FALLS, TEXASModel  
"A"  
1-TonChassis  
\$1650**Here's Another Group  
of Engineers**

This group designs, specifies for, and builds the famous

**Saurer Truck**

Their thorough, competitive tests, covering a period of nearly a year, have shown them "what's what" in bearing bronzes, and, like the builders of practically every one of the other fine motor trucks and motor cars in the country, they now use NON-GRAN bronze exclusively.

**NON-GRAN**

It is the famous interlocked, cohesive structure of NON-GRAN bronze that enables it to so thoroughly withstand frictional pull.

Let us show you what NON-GRAN bearings, bushings, spur and worm gears, will do for you. Write us now for full particulars.

**AMERICAN BRONZE COMPANY**  
342-376 Chester Boulevard  
BERWYN, PENNA.Sole manufacturers of NON-GRAN and largest exclusive  
manufacturers of bearing bronzes in the world.**VICTOR  
BLOCK TIRES**

Make a big cut in truck operating expenses. Each block being individual, there is no possibility for heat generation, and the full wear of the rubber is assured. Victor Blocks have perfect traction all the year round—no necessity for chains.


A block may be removed in a few minutes by simply taking out one bolt. This means an end to long road delays and keeps deliveries going on schedule time.

We also manufacture the

**VICTOR ENDLESS TIRE**

Especially adapted for light delivery trucks and for front wheels of heavy duty trucks. It has a base composed of several layers of heavy duck impregnated with a hard rubber compound. Adheres perfectly to its base, does not creep upon the wheel and gives the full wear of the rubber down to the flanges.

**THE VICTOR RUBBER COMPANY**  
SPRINGFIELD, OHIO



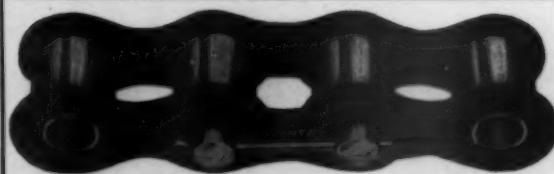
## Your Trucks Are No More Efficient Than Their Tires

When choosing your tires you should investigate just as fully as you do when you buy your motor trucks. For no matter how efficient the truck, it cannot give you proper service unless the tires themselves are efficient.

We should like to tell you why thousands of truck owners are finding their answer to this efficiency question in the Republic Steel Base Motor Truck Tire, and how you can reduce the maintenance expense of your trucks by equipping them with this tire. Write us today for the full facts.

**THE REPUBLIC RUBBER CO., Youngstown, Ohio**  
Branches and Agencies in the Principal Cities

**REPUBLIC**  
STEEL BASE  
MOTOR TRUCK TIRE



## "The Coventry" Detachable Roller Chain

Note the large heavy-duty cotter-pin connecting the two rivets. The mechanical superiority of this method of coupling can easily be appreciated. Vibrations and jars cannot weaken the double-size coupling as is the case where two smaller cotter-pins, one for each rivet are employed.

Combine the established reputation of "The Coventry" Chains for precision, perfect retention of pitch and unparalleled durability with this final touch of perfection and you will understand why "The Coventry" Chains are consistently specified by those desiring the maximum of transmission efficiency.

Our catalog comprehensively covers "The Coventry" line, and will be sent immediately upon request.

**Sarco Engineering Co.**  
Dept. V 116 Broad Street New York

# ROSS STEERING and DIFFERENTIAL GEARS

are standard on good  
motor truck  
construction

WRITE FOR CATALOG

**ROSS GEAR & TOOL CO.**  
790 Heath St. :: Lafayette, Ind.

"Reliable Springs are  
More important on  
Commercial Cars than  
on Pleasure Cars."



**THE PERFECTION SPRING CO.**  
Cleveland - - - - - Ohio





Specially Designed

## ROWE TRUCK

In the Service of the Lifter Ice Cream Co.

The Lifter Ice Cream Company operates two Rowe Trucks in its regular service in West Philadelphia and Manayunk. The delivery is made in one-half the time made by wagons, and, in addition, each truck is enabled to take two wagon routes. No severer test can be given any truck than hauling ice cream, the packing of which is more or less destructive to trucks. The Rowe Truck has solved the difficult problem of ice cream delivery.

**Rowe Motor Manufacturing Co.**  
COATESVILLE, PENNSYLVANIA

# B. A. Gramm's Motor Trucks

Newest Designs, Latest Improvements; Built in every detail to insure satisfactory and permanent results.

Write for photographs, descriptive literature and the exceptional values we offer you—far beyond all others.

**The Gramm-Bernstein Co.**

*Exclusive Motor Truck Builders*  
Lima, Ohio, U. S. A.

## FEDERAL GRIPS



Designed and made *expressly* for solid tires. Built for *continuous* hard service. "Quick Attachable" and compact in form. Made of *nickel steel*. Will *not* injure the tires. Every set *guaranteed*.

*Territory open for good representatives.  
Catalog on request.*

**FEDERAL CHAIN & MFG. CO.**  
SPRINGFIELD, MASSACHUSETTS

## Schafer Ball Bearings

*"Famous for their Durability"*

Radial or Annular Bearings for radial load only.

Axial or Thrust Bearings for axial load only.

Diagonal or Combination Bearings for diagonal or combined axial and radial load.

There is a size and type of Schafer Bearing for every bearing service.

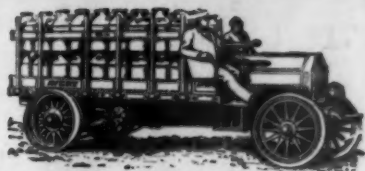
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**BARTHEL & DALY**

*Sole Importers*

42 Broadway

New York



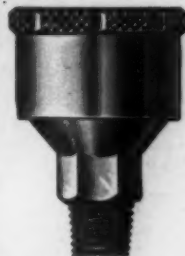
## Why Wheeler Bought His Second Avery

In September, 1909, Mr. J. F. Wheeler bought his First Avery Truck to use in the freighting business between Millard and Omaha. This is why he bought his Second:

1. His first truck did away with all the dirty, tiring work with horses.
2. His first truck did the work of 6 to 8 horses at  $\frac{1}{2}$  the expense.
3. His first truck has traveled over 65,000 miles under full-capacity loads.
4. His first truck has made the 40-mile round trip between Millard and Omaha nearly every day including Sundays for the last  $3\frac{1}{2}$  years.
5. No work has been done on his truck with the exception of his own care.
6. His first truck has saved him \$1855.55 per year.
7. His first truck more than doubled his business, so he had to buy a second to use with his first one in order to handle his added work. He bought an Avery because he wanted to keep his cost per ton mile down and his saving per year up.

There are many other people making money with Avery Trucks. Write for a catalog and the experiences of others. Address

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PLAIN COMPRESSION  
(Patented)

## Empress

BRASS AND STEEL

## GREASE AND OIL CUPS

### WE MANUFACTURE

a full line of Plain, Leather Packed, Ratchet, Marine, Spring Compression, and many other styles of Grease Cups.

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Catalogue on Application



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**Bowen Manufacturing Co.**  
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## Swinehart Cellular Truck Tires

Most resilient solid tire made. Absolutely non-skid. Increases traction and eliminates undesirable slipping and friction. Does away with the use of chains. The holes in the tire act as a radiator, preventing excessive heating and internal friction.

The extra large surface of the Swinehart tread reduces the pressure per square inch to a point well within the safe and economical limit.

The wonderful elasticity, due to the combined use of our cellular design and the highest grade of rubber, allowing the tire to "give and take," to stand the road shocks without damage, is the true secret of Swinehart longevity. Demountable Quick Attachable.

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Absolute Necessity for Commercial Cars

## SUCCEED WHERE OTHERS FAIL



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Try a set at our expense

We also make bumpers to protect radiator and other vital parts at front of truck.

**J. H. SAGER COMPANY**

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Buckeye Motor Truck Jacks are safe, reliable and made to stand the wear and tear for which they are intended. They are fully guaranteed, and cannot possibly drop with a load. They are made from Steel Drop Forgings, best finish and workmanship throughout.

Get our prices before you place your orders for jacks, we can save you money.

No.	Height Bar Down	Raise of Bar	Height Bar Up	Weight	Capacity	List Price
7	11 $\frac{1}{2}$ "	6 $\frac{1}{2}$ "	18"	16 lbs.	2 $\frac{1}{2}$ tons with formed handle	\$10.00
13	14 $\frac{1}{2}$ "	7 $\frac{1}{2}$ "	20 $\frac{1}{2}$ "	26 $\frac{1}{2}$ "	3 "	15.00
14	14 $\frac{1}{2}$ "	7 $\frac{1}{2}$ "	20 $\frac{1}{2}$ "	33 "	5 "	16.00
9	11 $\frac{1}{2}$ "	6"	17 $\frac{1}{2}$ "	10 "	1 $\frac{1}{2}$ "	6.00

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There is no question as to the quality and efficiency of the King. This means low cost of maintenance. If you want a truck that will do real work and stay on the road, it will pay to investigate.

*We can give you the service  
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## CROCE 1500 lb. Delivery Wagon

(Closed Body)

Price, Chassis, \$1,750. Complete, \$1,850

Croce Delivery Cars are worth looking into whether you are agent or purchaser. Our cars are not built for the man that is looking for cheap material. This car is built to last and is built for the man that knows a good car. **THE TIME IS PAST WHEN COMMERCIAL CARS SELL BY THEIR LOOKS.**

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represent the last word in the art of truck body building. They stand for strength, stability, sturdiness and efficiency. Made entirely of steel, they will not rot or crack. They cannot warp or split. They will stand the maximum use or abuse and are practically indestructible. They eliminate fire risk. They are light in weight and easy on tires—pleasing in design and attractive. Summed up in a word, they give the highest degree of Service.

They are made in many styles—of any desired capacity. Estimates promptly furnished. Write us today for full information.

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They Are Good Trucks**

## LANGE TRUCKS ARE GOOD TRUCKS

**Read a Few Facts Regarding Them:**

The Royal Laundry Company of Sedgwick Street, Pittsburgh, operated a Lange truck for a period of eleven months, covering 22,000 miles, at a cost for repairs of approximately 60c per 100 miles. They have just put into service a duplicate truck and are well pleased.

The Model Candy Company of Beaver Falls, Pa., operated a Lange truck for approximately eight months, without a cent for repairs; they have their second truck in use about 4 months. Both trucks cover 40 to 50 miles per day.

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The Combination Chemical & Hose Truck in use by the Kittanning Fire Department, in a recent test with other well-known makes, took first place in speed, hill climbing and accessibility. It was pronounced the most handsome and finest truck in the field.

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**THE TRUCK BUILT ON EXPERIENCE**

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## MOTOR TRUCK



## COMPRESSED AIR MOTOR TRUCK

## GASOLINE TANKS

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**STRONG AND STURDY FOR ROUGH SERVICE  
ALL SIZES IN STOCK**

**AIR PRESSURE RESERVOIRS FOR  
SELF-STARTERS AND GARAGE TIRE FILLERS**

*New Catalog Now Ready—Write Us*

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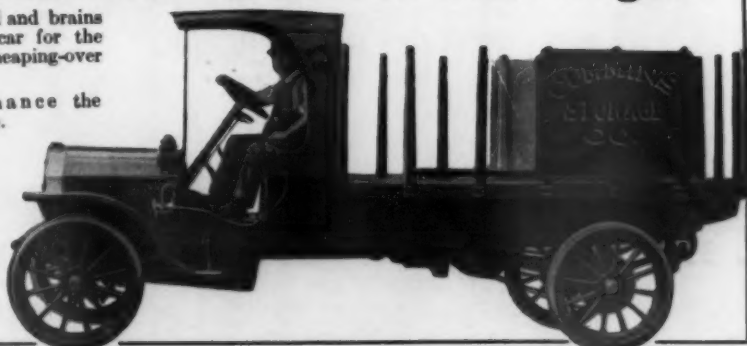
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It's built right. The stuff is in it—both material and brains—minus all fuss and jim-cracks. A practical car for the practical buyer—the man who likes to get heaping-over measure for his money.

The closer you investigate it the better chance the "MODERN" has of landing in your delivery garage.

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**The Bowling Green Motor Car Company**  
Dept. A Bowling Green, Ohio



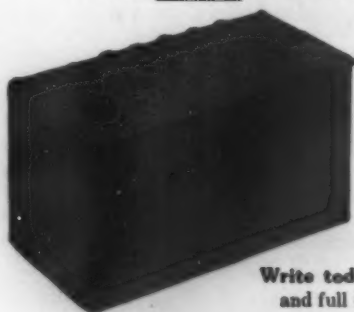
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Detroit Force-Feed Oilers are made with **two** compartments (as well as one) for feeding two different kinds of oil. One compartment feeds gas-engine oil to the cylinders—the other feeds a cheaper, heavier oil to the bearings, etc.

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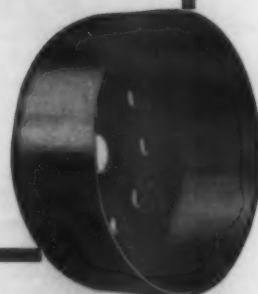
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**Heavy Flanges, etc.**

**Any Diameter,  
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Milwaukee : Wisconsin



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The flexibility of the Hyatt Roller absolutely insures full line contact, hence guarantees uniform distribution of the load.

Flexibility is an exclusive feature of the Hyatt Roller.

**Hyatt Roller Bearing Company**  
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Works, Newark, N. J.

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Try them at our expense. Be your own judge—don't take anyone's word for it. "The proof of the pudding is in the eating."

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Internal Gear Driven (no chains)

Nickel steel—or better—from bumper to tail gate. The fact that 66% of our factory output is made up of re-orders is proof that the MAIS is the best proposition for User and Dealer.



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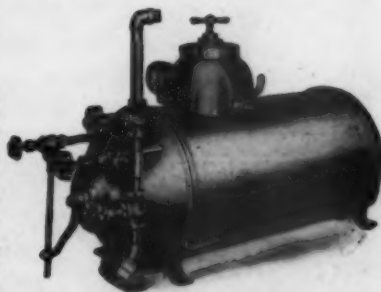


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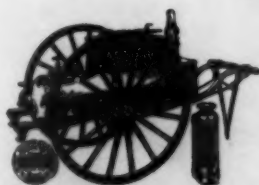
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of every description for department apparatus. We are equipped to make tanks of any size or type.



35-Gallon Copper Tank



We can equip any chassis complete with body, chemical apparatus, etc. Ask us.

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The  
Delivery Car



## Lippard-Stewart Cars Guarantee Efficient Delivery

Lippard-Stewart Delivery Cars give service because they are built to give it. They assure quick and dependable delivery over a wide territory at the minimum cost per package, because they are constructed by engineers who know and have fulfilled every requirement demanded of a thoroughly efficient delivery vehicle.

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**For Commercial and  
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We want to figure with you your requirements for the coming season. If you haven't used Fedders radiators you probably have had a great deal of radiator trouble and you may think that there isn't a radiator built that will give you satisfaction. If this is the case we would like to have an opportunity of demonstrating that the Fedders radiator will stand the wear and tear and shocks of the commercial car and that manufacturers who equip their commercial cars with the Fedders have practically no radiator trouble. We can convince you. Will you give us the opportunity?

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## THE KINSEY MANUFACTURING CO.

TOLEDO, OHIO

*Manufacturers of Auto Parts—*

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World's Largest Manufacturers of Ignition

**Y**OU do not want flimsy and frail ignition on your truck; you do not want ignition that will fail during the busy season.

What you do want is a sturdy, staunch, reliable magneto built for rough work under all traffic conditions.

The Remy truck magneto is designed by Remy engineers after actual experience in gasoline truck transportation. Specify "Remy Magneto."

*Write us about Magneto Exchange Offer; liberal allowance for any make*

**Remy Electric Company**  
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**Better Service—Time  
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The man who buys a motor truck today must have a sounder reason than that it "advertises the business."

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That's why we have insisted on their absolute simplicity and thorough reliability. To make sure we build the entire truck—motor and all.

Bodies as you want them—any style required.

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*First American Truck Manufacturers to use the French type hood  
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**The MOORE Truck**  
**Capacity 1600 Pounds**

The Moore Truck is designed to furnish reliable service at low upkeep expense. It is so simple that no high-priced man is required either to operate it or to keep it in condition. All its work is done quietly at a low motor speed which reduces noise, vibration and wear to a minimum. Write for descriptive circular.

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SYRACUSE, N. Y.

We Want Live, Business-Getting  
**AGENTS AND DEALERS**  
In Every County in the United States  
To Handle Our Product in 1913.

There are more  
**MERCURY HALF TON TRUCKS**

In use in Chicago than any other kind—  
You can equal this record in your Territory.

The Price  
of this  
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**\$750.00**

Write for  
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But accuracy, uniformity and the rapid production of interchangeable and standardized parts made new types of grinding machines necessary.

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Look into this matter of your equipment carefully. Write us just what your grinding problems are — send us samples or prints. We'll tell you what

## **Heald Precision Grinding Machines**

will do on your work. Definite information — not generalities — and no obligation on your part.

*Our catalog is full of helpful information — not merely cuts of machines.*

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## For Country Roads

**A & R Motor Trucks are particularly adapted by reason of—**

Their wide tires

Extreme ease of steering

Suitable tread

Great Power, and Even Distribution of Load—the Ideal for Efficiency.

A & R Trucks eliminate delays due to poor roads and adverse weather conditions.

**"For Dependable  
Heavy Service"**

**Abendroth & Root Mfg. Co.**

Since 1867

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## Hydraulic Pressed Steel Co.



**TRUCK FRAMES**

**½ TON TO 10 TON**

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## Upon Knowledge of Truck Mileage

### Veeder Hub Odometer

**\$25**

At Your Dealer's or  
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You, as a commercial car user, must look upon the money paid for trucks as just as much of an investment as money paid out for supplies, additions, stocks, etc., and you should insist on a proper return from this investment as well as upon the others.

To make your truck investment pay it is *absolutely essential* that accurate records be kept of the distance the truck travels. By such records, and only by these records, can you check your tire guarantee, your drivers' capabilities, gasoline and oil consumption per mile, cost per ton for each mile, etc., etc.

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Send for Catalogue D, descriptive of HUB ODOMETER.

**The Veeder Manufacturing Co., Hartford, Conn.**

Makers of Cyclometers, Odometers, Tachometers, Tachodometers, Counters and Small Die Castings.

# AUTOMOBILE WHEELS for PLEASURE CARS and TRUCKS

*Repairing and truing old wheels  
a specialty*

*Experimental wheels a specialty*

*We furnish and apply any style  
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ESTABLISHED 1888

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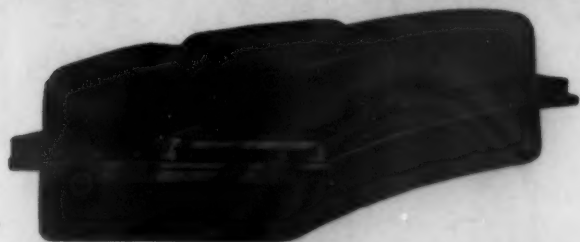
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## The Great Labor-Saving Truck Tire

Here's a tire with an astonishing advantage for you men who want mighty rear-wheel traction combined with the non-skid feature. A tire that by all odds is the most trouble-proof, trouble-saving block tire made.

Note here the big feature of this remarkable tire. Then let us send booklet describing our seven great Truck Tires, including the

**GOODYEAR**  
AKRON, OHIO

### Individual Block Truck Tire

A non-skid tire for Heavy Trucks, ideal because of SIMPLICITY.

The big advantage of this tire over all other block tires lies in the simple method of fastening in the blocks.

Instead of a single fastening holding in several blocks, in this tire each block has its own fastening.

Instead of being obliged to disturb several blocks when you want to remove, replace or adjust one block, you manipulate the fastening of this one block only.

Instead of several blocks working loose and wearing out because an intervening block won't permit a tighter adjustment of the plate that holds in the group, every block can be kept tight; working loose can be prevented; the life of the tire is thus multiplied.

And the only tool necessary for these adjustments is the simplest kind of a wrench. Loosen two bolts, pry up the plate—out drops the block. And it goes back just as easily. A tire that saves time, trouble, expense!

### Six Other Saving Tires for Motor Trucks

No matter what your truck tire requirements, there is a Goodyear Tire that will mean a saving over all others—a tire made by experts to do a certain kind of work—a tire that hundreds of users will tell you excels in doing this work.

Don't take chances with the efficiency of your motor trucks. Realize the relation between truck service and tire service. Demand a maximum of both. Our booklet on truck tires tells you how to get it. May we send you one?

Let Us Send Our Book on Truck Tires

**The Goodyear Tire & Rubber Co.**  
AKRON, OHIO

Branches and Agencies in 103 Principal Cities  
We Make All Kinds of Rubber Tires, Tire Accessories and Repair Outfits  
Main Canadian Office  
Toronto, Ontario  
Canadian Factory  
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Model C Dart Truck  
Complete with body \$1950

## An Interchange of Success

Each of the hundreds of Dart Trucks running today is the embodiment of success—a tribute to its successful owner and this successful business.

We have aimed to build such high quality into Dart Trucks that each sale would mean an interchange of success—success for the user as well as ourselves.

**Dart**  
Motor Trucks

Model E D  
\$750

Model B  
\$1200

Model C  
\$1775

The demand for Dart Trucks this year has eclipsed the output of any of our ten years of Motor-Truck building. Never, in our entire history, has the demand been so great. We are now shipping Dart Trucks to all parts of the world. And the reason for this phenomenal demand is the exceptional value we give—more actual, tangible motor-truck value than can be found in any other trucks at anywhere near Dart prices.

The illustration portrays a Model C Dart Truck with special body for the Smith, Lichty & Hillman Co., Wholesale Grocers. This is a 3,000 pound capacity Dart Truck. Motor, 35 to 40 H. P., 4-cylinders, 4 1-16 in. x 5 1/2 in. Stromberg Carburetor. Eisemann Automatic Spark Magneto. Center control. Left-hand drive. Sheldon axles. Self-intensifying brakes. Tires, 38 in. x 3 1/2 in., Goodyear side flange, S. A. E. specifications. These brief specifications only hint at the quality embodied in Dart Trucks. We can furnish the Dart Truck complete with special body, as illustrated, including all specifications, for \$1,950—a revolutionary price.

The tremendous demand for Dart Trucks necessitates quick action if you want to obtain one. Write us at once for catalog and the name of our dealer nearest you.

**The Dart Motor Manufacturing Co.**

Dept. J.

Waterloo, Iowa  
22-A



## STANDARD Adjustable Taper Roller Bearings



After exhaustive tests, S.R.B. Taper Roller Bearings have been selected by the following motor truck manufacturers for use in their wheels:

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The Rolls of S.R.B. Taper Roller Bearings offer an effective bearing surface over their entire length, thus giving the bearing a greater radial load capacity for a given width of bearing than is possible with any other design.

The large shoulder on the Cone allows of the bearing taking a maximum end thrust with a minimum wear.

For prices and further data, write,

**STANDARD ROLLER BEARING COMPANY, Philadelphia, Penna.**

## REAR WHEEL SPROCKETS AND DRUMS

Cast in One Piece



Deliveries beginning one  
week to ten days

**Tensile Strength**  
70,000 lbs.

**Elastic Limit**  
40,000 lbs.

**Elongation**  
20%

**Reduction**  
30%

SAVE MACHINING  
TIME BY BUYING THE  
BEST

Radius Rods  
Jack-Shaft Hangers  
Front Axles  
Worm-Drive Housings  
Spring Hangers  
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**Michigan Steel Casting Co.**  
DETROIT MICH.



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**BALL ~ BEARINGS**

**HB DWF**

**The Hess-Bright Manufacturing Company**  
*Pioneers in the introduction of Annular Ball Bearings*

Most extensive resources and plants in existence devoted exclusively to ball bearing manufacture. Enlarging and improving facilities, product and capacity for distribution.

Main Offices and Plant No. 2 on line of Penna. R. R. to New York  
 41 E. Erie Avenue, Philadelphia, Pa.

*Stems for Retail Distribution:*

**PHILADELPHIA** 666 North Broad Street  
**NEW YORK** 1974 Broadway  
**CHICAGO** 1800 Michigan Avenue

CATALOGUE UPON REQUEST

## Reduces Gasoline Bills 25 to 40%!



*The Mondex-Helix Mixer*

### The New Carburetion Method

**MONDEX-HELIIX**

#### in Combination with any Carburetor

Saves one-fourth to about one-half gasoline and doubles the power of poor gasoline.

Gives 100% increased flexibility. Increases power on hills and all grades—at minimum and maximum speeds—from 10% at high speed, to 50% at low speed—particularly heavily loaded vehicles.

Makes a noisy motor silent and smooth. Prevents back-firing and carbonization. It minimizes wear and tear.

Used by the Consolidated Gas Co., I-T-O-A Cab Co., Knox Automobile Co., Selden Motor Vehicle Co., Western Electric Co., Long Island R. R. Co., Mason-Seamon Transportation Co., U. S. Motor Cab Co., N. Y. Telephone Co., John Wanamaker, Stern Bros., Brooklyn Eagle, Burns Bros. and hundreds of other large concerns.

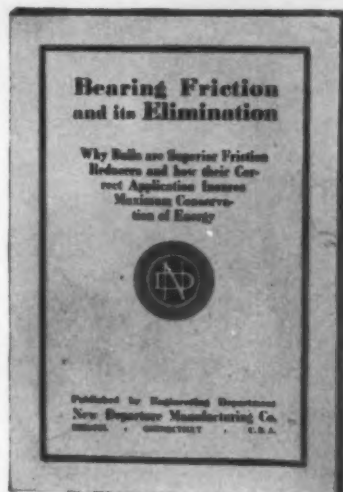
Sizes for any carburetor sent, with full instructions, C.O.D. or by mail on receipt of price.  
 Sizes 1 inch to 1½ inch . . . **\$3**  
 Sizes 1½ to 2 inches . . . **\$4**

AGENTS WANTED

**THE ARISTOS COMPANY**

254 W. 54th St., N. Y.

When Writing, Please Say—"Saw Your Ad. in the C C J"



## Can we send you a copy of this Booklet?

Our Engineering Department has published the first of a series of booklets discussing the latest developments in the solving of bearing problems.

This first brochure is entitled "Bearing Friction and Its Elimination," and aims to show why balls are superior friction reducers and how their correct application secures maximum conservation of energy.

The types of bearings particularly discussed and compared in this writing are the ball and roller bearings, as applied to all bearing points in the motor car.

It discusses and explains the growing tendency among engineers and manufacturers to favor the ball type of bearing, as evidenced by the summarization figures published by the "Horseless Age" in a review of 1913 pleasure car models.

These figures show that ball bearings are used in the differential of 53% of pleasure cars for 1913, as against 37½% of the 1912 models; in the transmission of 75%, as against 64%; and in the rear wheel of 52%, as against 42%.

This brochure will interest you. Copy will be mailed you promptly on request.

**THE NEW DEPARTURE MFG. CO., Bristol, Conn.**

Western Branch: 1016-17 Ford Building, Detroit

## We Want Agents

to share in the GOOD WILL of a corporation with \$11,000,000.00 of capital, with twenty years' experience and with 20,000 customers.

Our SIX factories at Detroit, Cleveland, Erie, Pa., Chicago Heights, Ill., and Franklin, Pa. (2), are turning out high-grade machinery products that are sold and used in every quarter of the globe.

**The "Little Giant" Commercial Car is one of these products.**

**Capacity  
One Ton**



**Any Style  
of Body**

*Write for Prices and Terms. Address Dept. M.*

**Chicago Pneumatic Tool Company**

1010 FISHER BUILDING  
CHICAGO

Branches  
Everywhere

50 CHURCH STREET  
NEW YORK

When Writing, Please Say—"Saw Your Ad. in the C C J"





## Commercial Vehicles

Give You the Lowest Cost for Short Haul Delivery

Economical solution of the long delivery route with many stops, has been the bugbear of light truck manufacturers, and the merchant's despair. Heavy duty trucks long ago solved the problem of long distance, non-stop delivery.

What was needed was a light commercial vehicle that would cover a wide territory, capable of stopping and starting quickly many times, without the wear and tear of constantly shifting

gears, and no loss of running power while standing still.

Detroit Electric Commercial Vehicles solved the short haul delivery problem.

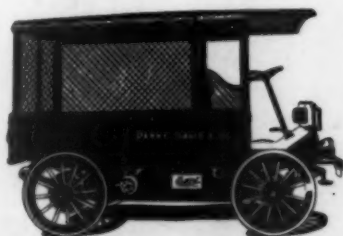
Five speeds, all controlled by a simple lever with no gear shifting, make the Detroit Electric easy to handle in the heaviest traffic. Any horse driver can quickly learn to drive it.

The Detroit Electric uses the Thomas A. Edison battery exclusively, giving it a marked superiority in final

cost of operation, over any other electric commercial vehicle made.

Building the Detroit Electric entirely in our own shops, we can guarantee service to our users for a longer future period than any other manufacturer of electric delivery cars.

Let us demonstrate to you the minimum cost of short haul delivery as proved by actual work of Detroit Electric commercial vehicles. We will be glad to send you our illustrated catalog and full information.

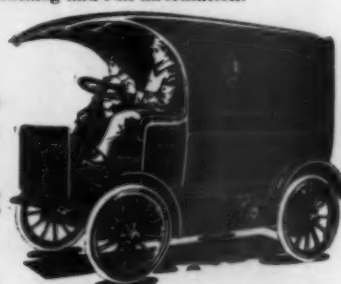


### Anderson Electric Car Co.

456 Clay Avenue, Detroit, Mich., U. S. A.

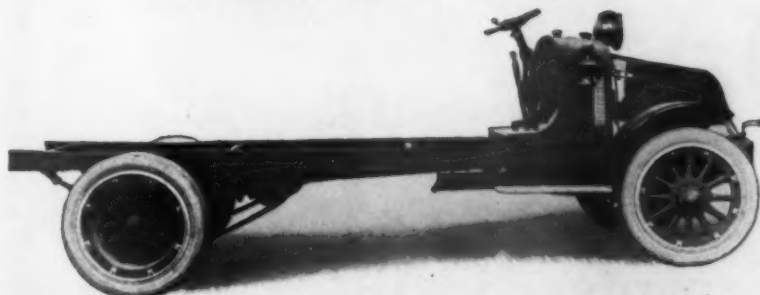
BRANCHES—  
 Boston New York: Broadway at 90th St. Evanston  
 Buffalo Kansas City  
 Cleveland Chicago: 2416 Michigan Ave. Minneapolis

Selling representatives in 175 leading cities



## The Governor of the Krebs Is on the Job Every Minute

It Helps a Good Driver  
and Restrains a Poor One



MODEL DD, 1½-Ton KREBS—a Favorite with Contractors

144-in. Wheelbase insures easy-riding qualities. 3¼ x 5½-in., four-cylinder, four-cycle motor.

Price, chassis only, with 36 x 3½-in. front and 36 x 4-in. rear wheels, \$1,775 f. o. b. Clyde, Ohio.

Electric Lights and Starter, and Dual Rear Wheels, as shown above, at nominal additional cost.

**T**HE KREBS is called "The Car That Thinks" because its governor constantly adjusts the fuel supply to secure just the amount of power required.

Set it for any speed and the Krebs will automatically retain that rate irrespective of road conditions.

The Krebs governor handles the gas better—more economically and with greater precision than human hands at the throttle.

It isn't merely a device to check the car when the speed reaches the danger point. It's always in control; the driver has nothing to do but steer.

The best buy for the owner's pocket-book and therefore the best selling proposition for wise agents.

Write today for information about all the Krebs models, and ask us about open territory.

## THE KREBS COMMERCIAL CAR CO., Clyde, Ohio

When Writing, Please Say—"Saw Your Ad. in the C C J"

# United States Standard Motor Truck Tires

(Demountable)



are the most easily  
manipulated tires  
on the  
market

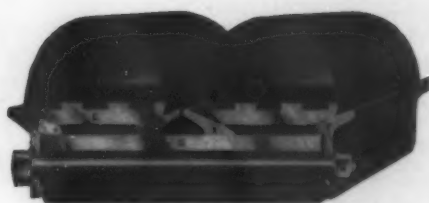


Do  
This—

Then  
This—



Then This—



and your  
Tire is off

Cross Section of the United States  
Standard Motor Truck Tire

**Absolutely Guaranteed for 10,000 Miles**

Conditional upon this mileage being used within one year

**UNITED STATES TIRE COMPANY, New York**

When Writing, Please Say—"Saw Your Ad. in the C C J"

**NOTE:** *If you are interested in any way in electric vehicles—trucks, delivery or pleasure cars—you will be interested in this.*

# New York City

is to have 40 more Storage Battery Cars equipped with

## "Nycap-Exide" Batteries

Here's the history of the "Nycap-Exide" Battery in storage battery street car service in New York City:

On May 21st, 1910, The Third Avenue Railway Co. ordered 1 "Nycap-Exide" Battery for experimental use on a storage battery car.

On June 8th, 1911, The Third Avenue Railway Co. ordered 35 more "Nycap-Exide" Batteries. The satisfactory service from the first experimental battery prompted the company to place their order for these additional batteries.

On October 24th, 1911, The Third Avenue Railway Co. placed their order for 15 more "Nycap-Exide" Batteries.

And now, on April 4th, 1913, The Belt Line Corporation, controlled by the same interests as The Third Avenue Railway Co., have just placed their order for 40 more "Nycap-Exide" Batteries.

Here are two significant facts: The Third Avenue Railway Co. tested out every make of battery and as a result every storage battery car ordered since the first purchase of 35 in June, 1911, has been equipped with "Nycap-Exide" Batteries.

The fifty cars now in operation and equipped with "Nycap-Exide" Batteries ran over 750,000 car miles during 1912.

*Batteries that will show satisfactory results in street cars will surely give good service in electric vehicles.*

## THE ELECTRIC STORAGE BATTERY CO.

Manufacturer of The "Chloride Accumulator," The "Tudor Accumulator," The "Exide," "Nycap-Exide," "Thin-Exide," and "Ironclad-Exide" Batteries.

New York Boston Chicago PHILADELPHIA, PA. Denver San Francisco Seattle  
St. Louis Cleveland Atlanta Detroit 1888-1913 Los Angeles Portland, Ore. Toronto



THE PHILADELPHIA  
STORAGE BATTERY COMPANY  
recommends its  
THIN PLATE BATTERIES  
for  
ALL CLASSES  
of  
ELECTRIC VEHICLE SERVICE

---

THE PHILADELPHIA STORAGE BATTERY COMPANY has taken this stand, not rashly, but because for SIX YEARS PHILADELPHIA THIN PLATES have proven their worth under ALL conditions of actual service.

For high mileage or low mileage---on hilly routes or on the level---from pleasure cars to parcel delivery and heavy trucking---you can insure the greatest economy of operation by using a PHILADELPHIA THIN PLATE BATTERY.

One of our pamphlets explains the reasons. Why not write for it?



PHILADELPHIA STORAGE BATTERY COMPANY  
*"Originators of the THIN PLATE"*

Ontario and C Streets, Philadelphia, Pa.

PHILADELPHIA   NEW YORK   CHICAGO   BOSTON   WASHINGTON   ST. LOUIS   ROCHESTER   DENVER  
TORONTO   CLEVELAND   PASADENA   LOS ANGELES

When Writing, Please Say—"Saw Your Ad. in the C C J"

# **Dyneto-Entz**

## **ELECTRIC STARTER**

### **AND LIGHTING SYSTEM**

#### **FOR**

## **COMMERCIAL**

## **CARS**

### **SINGLE UNIT SYSTEM**



## **SIMPLE—STURDY—ACCESSIBLE**

A starting device is an absolute necessity on a commercial car if a low upkeep is desired. Look on any street and count the number of engines that are left running while the car is standing still, simply because the driver does not want the trouble of cranking-up.

The Entz has no delicate parts to get out of order from jar and shock, it is built just as sturdy as the frame of your truck.

The Entz is the most simplified system for lighting and starting. It consists of a single unit that acts as generator and motor.

The change from generator to motor is done without the aid of automatic devices or any attention on the part of the driver. It is the natural function of the type of mechanism used. The direction of the current is controlled by the speed of the armature through its magnetic fields.

### **PREVENTS STALLING**

When the speed of the engine reduces to a point where it is liable to stall, its revolutions are assisted by the motor and as soon as engine picks up again the assistance from motor ceases, changing the motor to a generator. Battery is so constructed that it cannot be injured by overcharging, doing away with complicated automatic cutouts.

Only one switch—simply throw it on, it is not touched again until you want to stop engine. Adopted by the White Co., and the Franklin Mfg. Co. Illustration on this page shows Entz generator on White Engine.

*Write for full particulars*

## **THE DYNETO ELECTRIC COMPANY** **SYRACUSE, N. Y.**

**SALES AGENT—T. J. WETZEL, 42 WEST 42<sup>ND</sup> STREET, NEW YORK CITY, N. Y.**

When Writing, Please Say—"Saw Your Ad. in the C C J"



## TRUCKS



**B**ACHELDER & WASMUND, contractors of Detroit, use this GMC heavy-duty gasoline truck principally in making long city deliveries of cut stone.

In suburban work the vehicle has shown extraordinary efficiency. The straight-line pull of its drive chains, its powerful motor and extra large rear wheels have conquered the worst of country roads.

In city service the truck has replaced four teams.

This is but one instance of GMC success in contracting and allied lines.

GMC Electrics in short-haul service and GMC gasoline trucks of various capacities in longer distance work are each making excellent records.

Detailed information on equipment fitted to your individual needs, is yours for the asking.

*GMC Trucks are backed by the largest manufacturers of motor-propelled vehicles in the world*

**GENERAL MOTORS TRUCK COMPANY**  
**Pontiac** **Michigan**

*Makers of gasoline and electric trucks of all capacities*

BRANCHES:—New York Boston Philadelphia Detroit Chicago Kansas City St. Louis

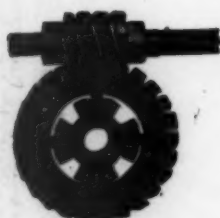


When Writing, Please Say—"Saw Your Ad. in the C C J"



# CRAMP

## Gear-Bronzes



1-TON GEAR

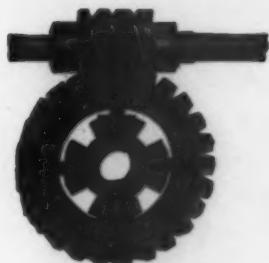
Cramp's metals will give longer life—resist wear and abrasion better—will withstand excessive strain and shock and heavier starting torque than any other gearing metals. Through merit alone, Cramp's metals have achieved dominant place as the world's best metals.

It is no advantage to import metals, we manufacture absolutely the best and save you duty, freight and time.

We furnish the metals and castings for Hindley Spiral Gears.

Write us—we can show you how Cramp's metals will better your products.

**The William Cramp & Sons Ship & Engine Building Co.**  
**PHILADELPHIA**



2-TON GEAR



3-TON GEAR



5-TON GEAR

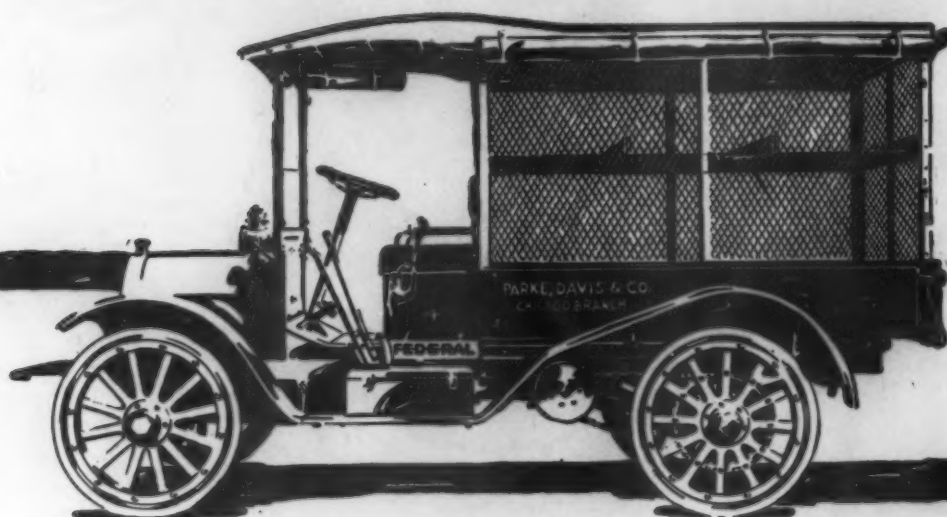
Metals look much alike. Before buying metals it is vitally important to consider the experience and reputation of the manufacturer, to know that the metals you use possess the qualities that will stand up in service and give the maximum of efficiency and wear.

The name CRAMP has for nearly a century set the highest standard in bearing metals.

Cramp's metals are the result of almost a hundred years' experience. They have been used during these hundred years for worm drives for every type of machine, from turret turning gear to lifting bridges, elevators, marine railways, etc.

When Writing, Please Say—"Saw Your Ad. in the C C J"

# FEDERAL



## The Truck Triumphant

The Federal has been tried and tested and has proven equal to every demand of a truck of its capacity.

For three years the Federal has been in the daily service of almost every line of trade in all parts of the country.

Today more than 1000 satisfied owners will tell you of Federal efficiency, of Federal quality and of Federal economy.

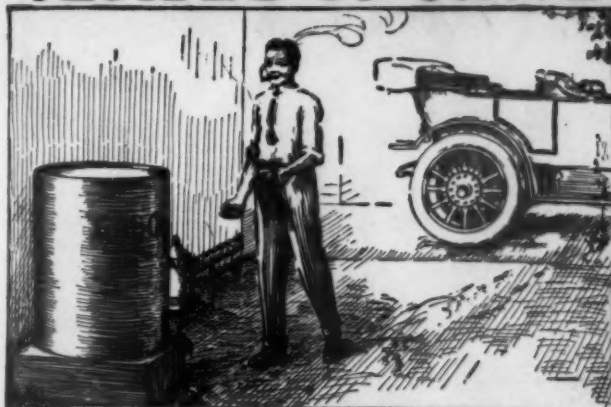
Among these thousand or more Federal owners are America's largest users of motor trucks.

We have solved their trucking problems, for all time to come, without expense or time to them. Let us solve yours.

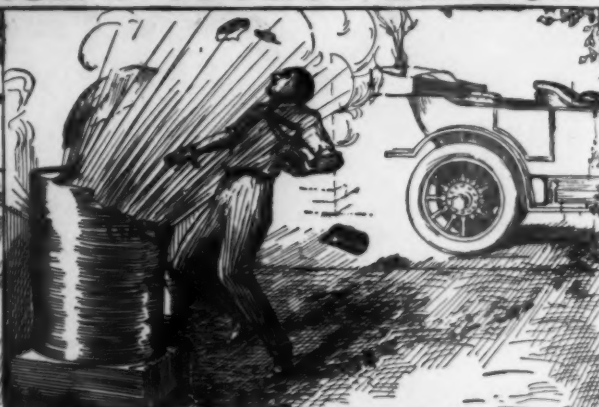
Write us for literature and name of nearest Federal dealer.

**Federal Motor Truck Co., Dept. A., Detroit, Mich.**

# MR. HARD-TO-CONVINCE'S OBJECT LESSON



"Humph! every time I think of that salesman's talk about 'air-tight' above-ground gasoline tanks I have to laugh. Of course, they cause a little more work—but the exercise is good for one."



"There, that's nine gallons. One more trip and I think the tank has enough. ... Swish! ... Bang! ... Gee Whiz! Who'd o' thought it?"



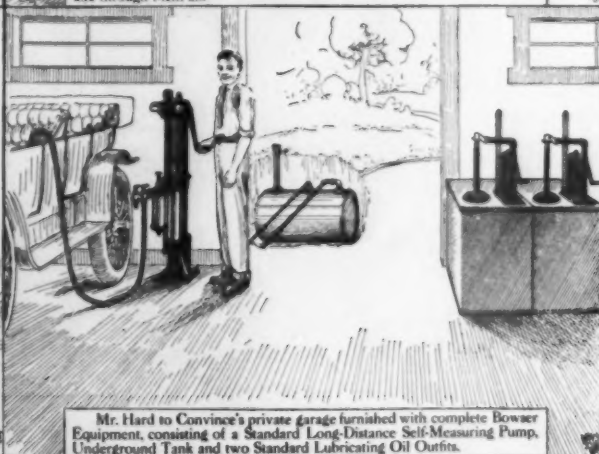
"Never again, nurse, never again! They saved the car, eh? Well, that's some consolation, but never again above-ground storage for liquid gun-powder."



"There, James, just cart the remains of that alleged 'air-tight' oil can and those lubricating oil makeshifts to the dump heap. Be sure and put an axe through them all!"



"Now, can you ship immediately? Good! You say they are made to conform to that measure of safety prescribed by the National Board of Underwriters? Well, here's my check. Good-bye."



Mr. Hard to Convince's private garage furnished with complete Bowser Equipment, consisting of a Standard Long-Distance Self-Measuring Pump, Underground Tank and two Standard Lubricating Oil Outfits.

On the Road Look  
for the "Red Sentry"

## S. F. BOWSER & CO., Inc.

At Home  
Use a Bowser

Home Plant and General Offices, Box 2118, Fort Wayne, Ind., U. S. A.

Sales Offices in all Centers and Representatives Everywhere

Original patentees and manufacturers of standard self-measuring, hand and power-driven pumps, large and small tanks, gasoline and oil-storage and distributing systems, self-registering pipe-line measures, oil-filtering and circulating systems, dry-cleaners' systems, etc.

Established 1885

When Writing, Please Say—"Saw Your Ad. in the C C J"



# POLACK

INSURES TRUCK SERVICE



ALL AROUND THE WORLD

When Writing, Please Say—"Saw Your Ad. in the C C J"



## Three Garfords saved more than double their cost in single year

**I**N the year 1912 three Garford motor trucks, used as patrol wagons in the police service of New York City, saved \$19,532.60, or \$6,510.86 each, over the maintenance cost of the nine horse-drawn vehicles they replaced. *This saving is equal to more than twice the original cost of the machines.*

*How this remarkable economy was effected by these Garford trucks is shown in the annual report of the New York City Police Department, given below:*

1911	
Boarding 21 horses @ \$30 per month	\$ 7,560.00
Shoeing 21 horses, @ \$5.50 per month	1,386.00
Repairs to 9 patrol wagons, \$35 per yr.	315.00
Repairs to 9 sets harness, \$5 per yr....	45.00
Eighteen patrolmen's salaries, @ \$1,400 per year .....	25,200.00
<b>Total .....</b>	<b>\$34,506.00</b>

1912	
Automobiles kept in station house .....	
Tires, 48 @ \$37.05 each .....	\$ 1,778.40
Gasoline, oil and grease .....	595.00
Nine patrolmen's salaries, @ \$1,400 per year .....	12,600.00
<b>Total .....</b>	<b>\$14,973.40</b>
<b>Saving .....</b>	<b>19,532.60</b>

Each truck fitted with the special patrol body, cost \$3,000 when new. Their installation retired the 21 horses and half of the 18 patrolmen necessary under the old system.

*Because of the showing made by these three trucks, Police Commissioner Waldo has ordered 10 more Garfords for immediate delivery.*

The accomplishment of these Garfords is characteristic of every Garford built.

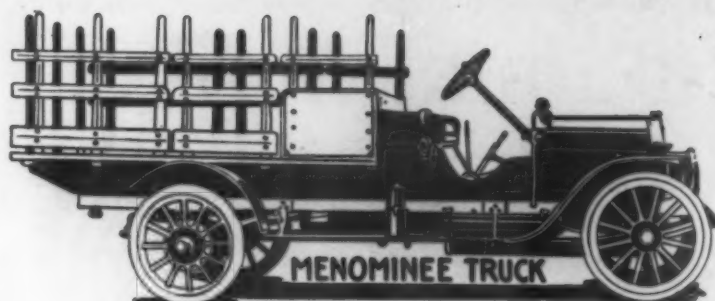
We build Garfords in a number of sizes for any work. Garfords are now operating successfully in more than 200 lines of business.

If you need a motor truck, there is a Garford for you. Tell us the problems you encounter in your transportation department and we will tell you whether a Garford will work an economy. Our traffic experts have figures on every industry.

Write today for our descriptive catalogues and literature. Please address Dept. 11.

**The Garford Company, Elyria, Ohio**

# "THE MENOMINEE" Motor Trucks



**1500 lbs.**—Carrying capacity complete with Express or Stake Body - - **\$1200.00**

**2000 lbs.**—Carrying capacity complete with Express or Stake Body - - **\$1500.00**

**3000 lbs.**—Carrying capacity complete with Stake Body - - - - **\$1950.00**

**T**O you Dealers and Users who, in a large measure, are responsible for the tremendous demand for a light, neat and strongly constructed motor wagon, we offer "THE MENOMINEE" Motor Truck. Users and Dealers who have become acquainted with the construction and efficiency of the truck during the two years it has been on the market, will gladly recommend it to you.

*Write for Our Free Illustrated Catalogue and Agency Proposition*

4-Cylinder Unit Power Plant

Sliding-Gear Transmission

Shaft Drive, Transmitting Through Special Reduction Gear

Full-Floating Rear Axle



**D. F. POYER COMPANY**  
**MENOMINEE MICHIGAN**



# KOEHLER COMMERCIAL CAR

CARRYING CAPACITY 1600 <sup>LBS.</sup> PRICE \$750.

## An Additional Model

An additional KOEHLER Commercial Car is now ready. It possesses the same excellent design and all the features that have distinguished the KOEHLER Car in the past, together with many refinements and improvements not to be had in any delivery wagon selling for less than \$1500. This model is equipped with 36" x 2½" solid rubber motor tires, both front and rear, on demountable rims, fitted on artillery wheels and hubs. This model has been added in order to meet the demands of many merchants who prefer the 36" rear wheels to the 48" rear wheels. Many improvements and refinements have been added that make for efficiency, reliability and economy, including the famous Model L Schebler carburetor.

Various types of bodies are obtainable. The Panel Type B is an unusually handsome job. Price, \$150 extra. Inside measurements: 42 inches wide, 51 inches from floor to top, 84 inches back of driver's seat to rear. Canvas side body, similar in appearance to Panel Type B—\$30 extra.



### Both Models Improved

Following the KOEHLER policy of giving utmost value, the builders of the car have increased the efficiency of both the high wheel and low wheel models. The Express type, illustrated above, has given remarkable satisfaction. Therefore this 48" rear wheel model with 2" tires will be continued, having added to it the many improvements and refinements incorporated in the 36" rear wheel model.

**Dealers:**—will do well to investigate the KOEHLER. It offers a splendid opportunity and an excellent selling proposition.



Large and roomy. Inside measurements, 44 inches wide, 84 inches back of driver's seat to rear. Flare-boards, 17 inches above floor. **CAPACITY**, 1600 lbs. **PRICE**, \$750. Strongly ironed throughout, also ironed to receive four-post canvas top, which can be had from stock at \$40 additional.

#### SPECIFICATIONS

**MOTOR**—2 cylinder opposed, 22-24 H. P. Lubrication mechanical and integral with motor; 300 miles one supply of oil; Model L Schebler carburetor.

**COOLING**—Thermo-syphon system.

**IGNITION**—Bosch High-Tension Magneto. No batteries or coil needed.

**CONTROL**—Left hand, throttle lever, on steering column.

**DRIVE**—Direct line double universal joint with jack shaft. Final drive from jack shaft to rear wheel sprocket through double side chains.

**TRANSMISSION**—Planetary type. All gears genuine chrome nickel steel, hardened throughout.

**BRAKES**—Service brakes on jack shaft. Emergency brakes simple in design, extraordinarily powerful, operated independently.

**TIRES**—2 in. Solid Rubber motor tires.

**TREAD**—58 in.

**CAPACITY**—1600 lbs.

**WHEELBASE**—87 in. **WHEEL**—36 in. front and rear, with artillery wheels and hubs fitted with demountable rims.

**SPEED**—4 to 16 miles per hour.

**PRICE**—\$750 to \$900, depending on body equipment.

**OIL-TIGHT CASE**—In which transmission, differential, bevel gears and metal to metal clutch run in a CONSTANT OIL BATH. 1000 miles with one supply of oil.

Address all correspondence to

**H. J. KOEHLER S. G. Co., 1709 Broadway, New York, N. Y.**

# Standard

## MADE IN DETROIT

---

**T**HIS is the age of the SPECIALIST. It is a recognized fact that an organization concentrating their entire energies on a SINGLE product, can make a better article at a LOWER PRICE than one that makes a variety of articles.

### We are Specialists on 3-Ton Trucks

Likewise the great organizations which produce the component units of the STANDARD Truck are specialists in their respective lines. The STANDARD is an ALL-STAR assembly of the products of the world's most famous specialists. It contains such well-known products as—Continental Motor; Timken-Detroit Axles and Jack Shaft; Brown-Lipe Transmission, Clutch and Control; Gemmer Steering Gear; Perfection Springs, and Spicer Drive Shafts and Universal Joints. It embodies nothing but STANDARD CONVENTIONAL DESIGN IN ALL PARTS. No "Features," no new "Ideas," no unproved "Theories"—just STANDARD in EVERY detail. This policy of Concentration and Specialization, makes it possible for us to produce a Superior 3-ton truck at a very low price.

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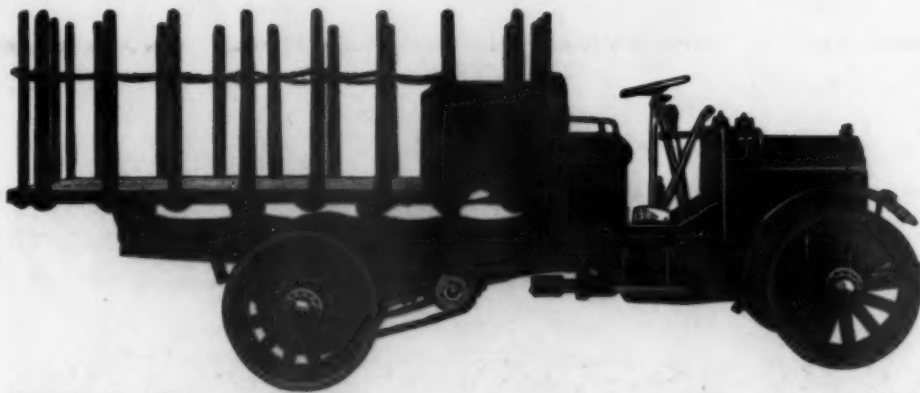
**Standard Motor Truck Company, Detroit, Mich.**

When Writing, Please Say—"Saw Your Ad. in the C C J"



## AGENTS WANTED

For the Highest Type of Commercial Car in Its Class



*Capacity, One Ton*

*Price of Chassis, \$2000*

Our Time Payment Sales Plan Places the

# SELDEN

Within easy reach of thousands of merchants and manufacturers who cannot afford to take \$2000 out of their working capital at one time.

This means that Selden Agents have five times the number of prospects their competitors do, to say nothing of the greater dollar-for-dollar value the Selden presents over every other truck.

*Write at once for Complete Sales Plan,  
stating territory desired and giving  
Sales and Service Facilities.*

## SELDEN TRUCK SALES COMPANY

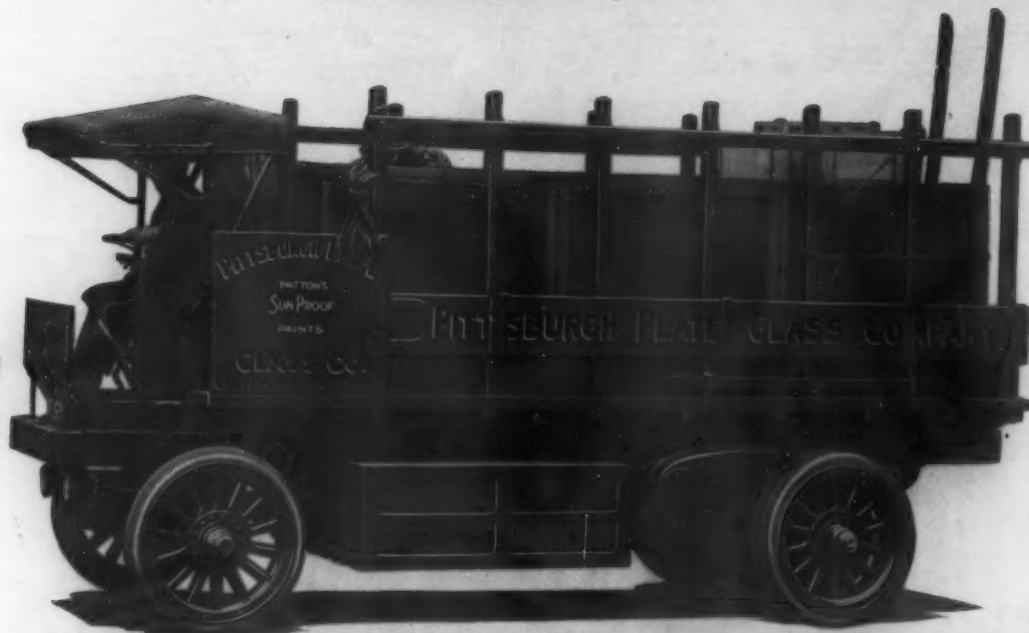
208 East Avenue

ROCHESTER, N. Y.



When Writing, Please Say—"Saw Your Ad. in the C C J"





## Important Facts About Speed and Mileage

The average speed of a high-grade gas truck in city service is about 25% greater than an electric. But in one year an electric truck installation frequently makes a greater total mileage than an equal gas installation, owing to the continuous service. The electric is always on the job.

The Baker Electric Truck may be depended on for service 98% of the working time. How about your gas truck? 85%? Then think of the efficient life of the electric as compared with the gas truck. The

## Baker Electric Truck

will answer every normal requirement. If you have suburban work, where high speed must be combined with distance, you can get it in a gas truck, BUT IT COSTS MONEY. But if your work is confined to city service—are you willing to pay for the rapid wear caused by frantic bursts of speed that are unnecessary, extravagant, dangerous and never demanded in normal service? Excessive speed has ruined more trucks than work—twenty times over.

### Yearly Mileage at Low Cost Per Mile

—not high speed—is the thing wise buyers consider today. Let us help you find the best solution to your own delivery problems—and tell you about the wonderful economy and efficiency record of the Baker Electric.

### "Why An Electric Truck?" Sent Free

Baker models run from 500 pounds to 4 tons, also tractors up to 8 tons haulage capacity, all backed by the largest exclusively electric vehicle makers in the world.



### The Baker Motor Vehicle Company, Cleveland, Ohio

Makers also of Baker Coupes, Victorias, Broughams, etc.

CANADA: The Baker Motor Vehicle Co. of Canada, Ltd., Walkerville, Ontario

Branches or Representatives in Principal Cities

Applications Solicited for Representation in Open Territory



This picture shows a portion of the big battery of Packard trucks which plunged into the relief work of flood swept Dayton

## THESE PACKARD TRUCKS HELPED TO PUT DAYTON BACK ON THE MAP

**F**OLLOWING the Dayton flood thirty-eight Packard trucks were used twenty-four hours a day to carry supplies and clean up the town.

The Citizens Relief Committee issued the call for help at noon, March 29. Two hours later, eight Packard trucks were loaded onto a special relief train at the Packard factory. Within twenty-four hours these trucks were at work in Dayton. Ten other Packard trucks were sent by special train from Cincinnati. These vehicles, with the large battery of Packards owned by the National Cash Register Company, formed the backbone of the transportation outfit used in relief service.

Dayton streets were choked with wreckage and debris. With all other methods of transportation rendered useless, necessity demanded motor trucks and they made a magnificent response.

The Packard trucks worked in water so deep that it was necessary to cover the radiators to avoid flooding the engines. In the stress of continuous emergency work, the trucks received no mechanical attention. It was a situation that called for 100 per cent efficiency and the Packards met this demand.

Sixteen hundred dead horses and many carcasses of other animals were removed by the Packard trucks within a period of three days. United States army officers say this prompt work averted an epidemic. Members of Dayton's Relief Committee state that the Packard trucks were a big factor in making the city fit for habitation.

The people of Dayton know that when necessity calls the Packard delivers. What will you do when your test comes?

### THE NATIONAL CASH REGISTER COMPANY

OFFICE AND HEADQUARTERS: CLEVELAND, OHIO  
BRANCHES: DAYTON, OHIO; CINCINNATI, OHIO; CHICAGO, ILL.; DETROIT, MICH.; PITTSBURGH, PA.; ST. LOUIS, MO.; ST. PAUL, MINN.; WASHINGTON, D.C.

Dayton, Ohio, April 9, 1913.

Mr. Alvin Macaulay,

General Manager, Packard Motor Car Co.,  
Detroit, Mich.

Dear Mr. Macaulay:

Your letter of April 8th is received, and I take the earliest opportunity of writing to thank you on behalf of the Dayton Citizens' Relief Committee, for the excellent assistance rendered by the Packard Motor Car Co., in our time of stress.

At the time we appealed to you, motor trucks were our most pressing need, as we had the greatest difficulty in getting provisions for hungry people to the different points in the city for distribution. Your promptness helped to save the situation.

Sincerely yours,

*John H. Patterson*

### HEADQUARTERS DAYTON MILITARY DISTRICT DAYTON, OHIO

Dayton, Ohio, April 17, 1913.

Packard Motor Car Co.,  
Detroit, Mich.

Gentlemen:

We are both pleased and grateful to report that during the past three weeks of most extraordinary service, Packard trucks have rendered invaluable and continuous service. The work has been continuous day and night over almost impassable streets. Without motor trucks it would have been impossible to have distributed relief supplies.

Very truly yours,

*W. H. Smith*  
Adjutant General.

**Ask the man who owns one**  
Packard Motor Trucks are in successful use in 169 lines of trade  
**PACKARD MOTOR CAR COMPANY, DETROIT**

When Writing, Please Say—"Saw Your Ad. in the C C J"

# Universal Motor Trucks

## Worm Drive

After two years of experimenting, we have adopted for our one-ton Universal Motor Truck the best standard English design of worm and worm wheel built here with imported machinery.

### Is This Form of Drive Reliable?

Absolutely.

This driving mechanism has stood the stress and strain of 10,000 miles of hard work, over country roads and city streets, on five test trucks that have been in experimental service since last spring.

### Is Worm Drive Best?

Certainly.

The worm drive as a means of motor-truck propulsion has been successfully used in Europe for years, but American manufacturers have been slow to take up the worm drive, because of existing patents.



The worm used in the Universal one-ton truck is a hardened steel forging. The worm wheel is made of a special bronze.

## Special Features of the Universal One-Ton, Worm-Drive Truck

Rated capacity, 2,000 pounds; guaranteed capacity, 1½ tons.

Weight, 3,300 pounds.

Engine: Mono-bloc; four cylinders; long stroke; enclosed valves.

Full 30 Horsepower.

Dual Ignition.

Full tired; front wheels, 34" x 3½"; rear wheels, 34" x 5".

Wheelbase, 130".

Loading space, 10 feet long and 3 feet from the ground.

Left-hand drive; center control.

Full-floating axles; Timken bearings; enclosed brakes; pressed-steel frame, and many other splendid improvements.

Motor truck dealers will realize that in making prices on this one-ton

truck we are inaugurating an entirely new departure in selling motor trucks.

We assume that when a customer wants a truck, he doesn't want to buy a chassis.

What he wants, is a complete outfit.

We are, therefore, quoting prices on this truck with two types of standard bodies, complete in every respect, fully equipped, painted, ready to put to work.

### Prices

Standard Stake Body - \$2,000.00  
Standard Express Body - 2,050.00

Painting, optional, with any standard colors.

In case a special design of body is desired, we will charge \$1,950.00 for the chassis, driver's seat and equipment. These prices are for cash only, F. O. B. Detroit.

### Really a 1½-Ton Truck

This truck, although rated at one ton, is really a 1½-ton truck at a one-ton price.

The reason we can put the materials and improvements into this truck and sell it so cheaply is because we manufacture in such large quantities.

Our factories, in Detroit, are the largest factories in the country devoted exclusively to making high-grade trucks.

### Other Models

We also manufacture and sell the Universal two-ton chassis, \$2,800.00 and the Universal Standard three-ton chassis, \$3,400.00, F. O. B. Detroit.

Motor truck dealers will find our selling contract a most liberal one.

## UNIVERSAL MOTOR TRUCK COMPANY

Factories:—Detroit, Michigan, U. S. A., 507 Theodore Street. FRED K. PARKE, Gen. Mgr.

When Writing, Please Say—"Saw Your Ad. in the C C J"